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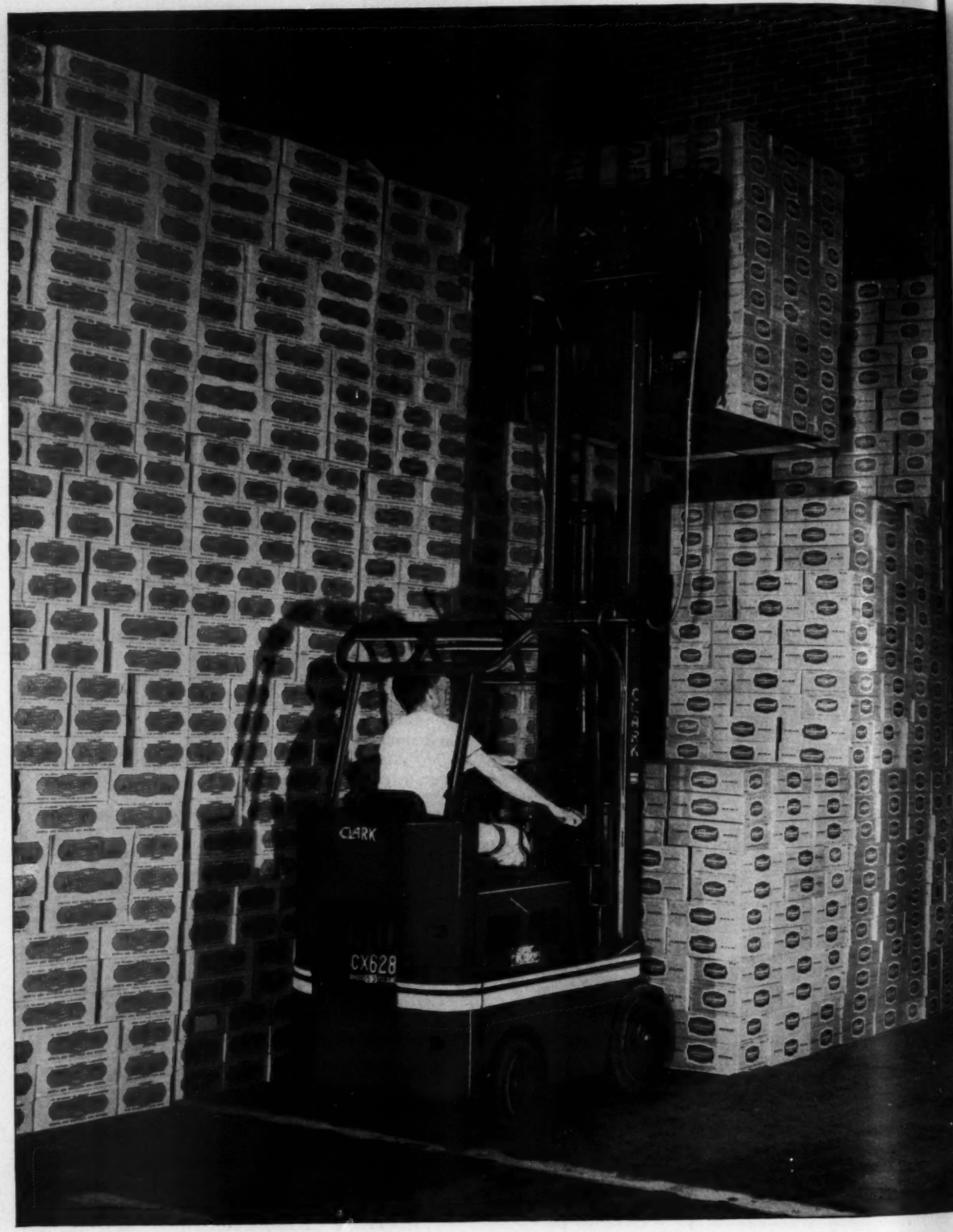
Here's Material Handling.



On the Line—

Holiday for Skill

During 1954, we heard of several cases of troubles with materials handling equipment—fork trucks, hoists, conveyors, an elevator and a crane. Since the first of this year, four such cases have come to our attention.

In one case, a fork-lift truck rolled off the shipping platform; an inexperienced operator pushed the wrong pedal. In another, neglect caused a major breakdown; nobody thought of lubricating the engine. In the third instance, a worker was injured; the fork-lift truck operator zigged when he should have zagged and a man was walking on the zig side. In the last case, cartons fell off a pallet and injured the fork-lift truck operator.

We did some checking and learned that proper instruction was given the users when the equipment was first delivered by the manufacturer. But, in three cases, the original trainees were no longer in the employ of the respective companies. In the fourth case, the original trainee was at the controls and he has had several mishaps.

Now, our concern goes beyond the examples cited. There must have been many more cases—such as those mentioned in the recent study by U. S. Department of Labor from which some data were excerpted and appear in Page 28.

Our question is: Really, how bad is the situation? The four recent cases cited could represent say, 10 per cent of the true number; they also could represent five per cent (80), two and one-half per cent (160), or one per cent (400).

Seems like its time for a national re-education in the operation of all types of materials handling equipment.

Over two years ago, Matthew Potts, one of DA's distinguished materials handling consultants, sparked a skill contest with powered industrial trucks. He foresaw the need for more and better training in the interest of greater safety and production, higher efficiency and economy. As usual, he was ahead of his times; he couldn't get industry support after the first "rodeo."

Certainly, both industry management and equipment manufacturer have more to gain than lose by giving the operators a day off once a year to match their skills. It would arouse a desire for self improvement, competition for the job, and provide trained replacement personnel ready when needed.

It's too late and too dangerous to train when the pressure of urgency demands immediate substitute operators.

Give the operator a day off to show off. It will pay off.

Yakkety Yak

We talked to several department heads in one industrial plant about handling equipment accidents and each disclaimed any responsibility.

The shipping room foreman:

..."I asked three people—the traffic manager, the production manager, and the purchasing agent—to get somebody to show us how to operate this equipment but nobody showed up. If the company only would pay decent wages, we could get good operators."

The traffic manager said:

..."We have neither time nor personnel to train operators. That's not our job. We are part of the production department. That's where the training should be given."

The production manager said:

..."As far as I know every operator is trained. We hire only experienced operators. The last accident happened on the shipping platform. The shipping room foreman is responsible for what happens there."

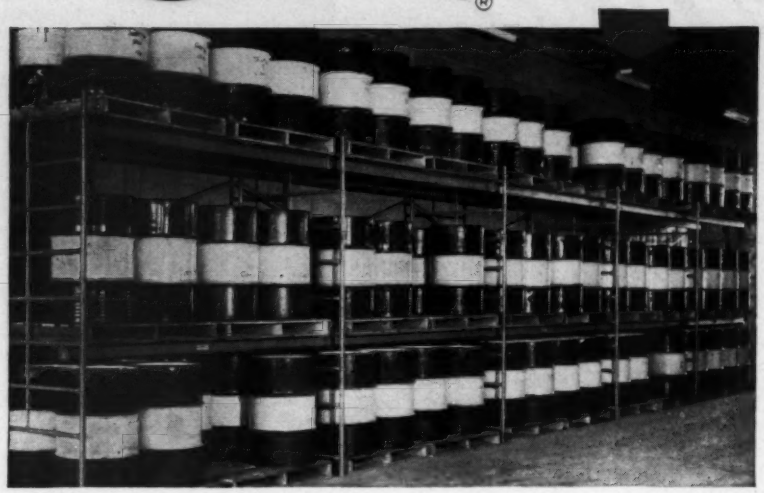
The purchasing agent:

..."I've had the manufacturers' men in to instruct the correct use of that equipment. The labor turnover is so great there that we can't expect instructors daily or weekly. We need better supervision in the shipping room. There's too much horseplay."

As we left the purchasing agent's office, we glanced at a cartoon hanging on one wall. It read, "People are no damn good"!

A. V. Greene Editor

Compare YOUR pallet racks with this Brainard® installation



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All pallet requirements can be met with various arrangements of four basic parts. No cutting or fitting is required. All frames are 100% reusable.

★ **QUICK INSTALLATION**

Two men can install Brainard racks in seconds . . . using only an ordinary wrench. Racks can be assembled and disassembled faster than any other method.

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Circle No. 4 on Card, Page 33, for more information

LETTERS
TO THE EDITOR

Refrigerated Storage

To The Editor:

We are interested in the recent ODM directive relating to refrigerated storage and the proposed policy concerning increased Army use of refrigerated storage.

At your earliest convenience please forward the directive relating to this subject as we are planning facilities for refrigerated storage.

R. D. McNaughton
McNaughon Bros.
Indiana, Pa.

Although the statement on the Army's plan to store combat rations in refrigerated facilities was issued in Washington, the program will be directed by the Quartermaster Corps office in Chicago. Details are available by writing Lt. Col. M. W. Dickson, Chief, Distribution Branch, Headquarters, QM Market Center System, 226 W. Jackson Blvd., Chicago 6, Ill. —The Editor.

All-Purpose Cars

To The Editor:

Since May, 1954, I've been actively interested in organizing the lumber industry in an effort to persuade the railroads to build a box car suitable for mechanical loading and unloading by our industry and others such as tobacco, furniture, plywood to name only a few. In other words, an all-purpose car, adaptable for so many industries needing just such a car, which could be operated without loss of equipment or revenue to the rails.

While the roads express deep concern about the ever-increasing tonnage moving by truck, they do not furnish the improved equipment to meet this competition.

Because of the great saving in cost of loading and unloading trucks, particularly packaged lumber, by fork-lift for instance, aren't the rails themselves responsible for driving shippers and their customers to truck delivery, with corresponding loss of tonnage and revenue to themselves?

For instance: In 1948 we shipped 772,078 ft. in 106 trucks. In 1953, 9,955,534 ft. in 1359 trucks. Our figures for 1954 show 10,313,046 ft. in 895 trucks. The loads are getting larger. In each 1953 and 1954 we shipped the equivalent of 500 cars averaging 20,000 ft per car, which would far exceed the minimum rail weight requirements. And our figures can be multiplied many times by other lumber shippers—to say nothing of the figures for other industries.

C. N. Troutner,
President
Troutner Lumber Co., Inc.
Richmond, Va.

Chuting the NEWS

Coming Events

May 5-6—Northeastern Motor Carrier Claim Conference, spring meeting, Philadelphia, Pa.

May 5-6—Association of Interstate Commerce Commission Practitioners annual convention, New York.

May 5-8—Local Cartage National Conference, annual meeting, Hotel Cleveland, Cleveland, Ohio.

May 9-12—Foreign Trade Transportation Institute, annual meeting, San Francisco, Calif.

May 10-12—Freight Claim Div., AAR, Denver, Colo.

May 11-12—Michigan Traffic and Transportation Conference, East Lansing, Mich.

May 14-15—Delta Nu Alpha Transportation Fraternity, annual spring meeting, Boston, Mass.

May 14-18—Foreign Trade Exposition, Shrine Exposition Hall, Los Angeles, Calif.

May 15-20—National Tank Truck Carriers, Inc., ATA, 7th annual convention, San Francisco, Calif.

May 16-18—Purchases & Stores Div., AAR, Chicago, Ill.

May 16-20—6th National Materials Handling Exposition, International Amphitheater, Chicago, Ill.

May 17-19—Communications Section, AAR, San Francisco, Calif.

May 18-20—Chain Store Traffic League, annual meeting, Hotel Sherman, Chicago, Ill.

May 24 — Southwestern Industrial Traffic League, Lubbock, Tex.

May 31-June 1—National Rivers and Harbors Congress, Washington.

June 6-9—The Operations Council, American Trucking Associations, Inc., annual meeting, Atlanta, Ga.

June 19-July 2—Material Handling Training Conference, annual meeting, Lake Placid, N. Y.

July 2-9—Mid-Summer Convention Cruise to Bermuda, Caster & Floor Truck Manufacturer's Assn.

July 6-11—Allied Van Lines, Inc., Annual Stockholders (AVL Agents) Meeting, Edgewater Beach Hotel, Chicago, Ill.

July 14-15—Middlewest Shipper-Motor Carrier Conference regular meeting, Cosmopoliton Hotel, Denver, Colo.

Sept. 18-21—Associated Traffic Clubs of America, 32nd annual meeting, Hotel Cleveland, Cleveland, O.

Sept. 19-22—Tenth National Industrial Packaging and Materials Handling Exposition, SIPMHE, Kingsbridge Armory, New York.

Safety Contest Winners Announced, Awards to be Made at Safety, Equipment and Maintenance Meeting

Safest truck fleets in the National Truck Safety Contest have been announced by Goley D. Sontheimer, director, Department of Safety, American Trucking Associations. Winners were chosen on the basis of fewest accidents and accident-prevention programs.

The awards will be presented by Neil J. Curry, Los Angeles, ATA president, at the annual Safety Award Luncheon, May 11, in the Leamington Hotel, Minneapolis, Minn., during the Spring Meeting of the ATA Council of Safety Supervisors and the Equipment and Maintenance Council.

Winners of first place trophies are Arrowhead Transport Co., St. Paul, Minn.; Hudson Bros., Henderson, Texas; L. L. Majure Transport Co., Meridian, Miss.; Ward Transport, Inc., Pueblo, Colo.; Walker Hauling Co., Atlanta, Ga.; Petroleum Carriers Corp., Jacksonville, Fla.; Ruan Transport Corp., Des Moines, Ia.; Bison Freight Lines, Inc., St. Paul, Minn.; Whitfield Transportation, Inc., El Paso, Texas; Pacific Highway Transport, Seattle, Wash.; Buckingham Transportation Inc., Rapid City, S. Dak.; Dixie Highway Express, Inc., Meridian, Miss.; Garret Freightlines, Inc., Pocatello, Idaho; Inland Motor Freight, Spokane, Wash.; Davidson Transfer & Storage Co., Baltimore, Md.; Interstate Motor Lines, Inc., Salt Lake City, Utah; Gate City Sash & Door Co., Ft. Lauderdale, Fla.; F. J. Boutell Driveaway Co., Inc., Flint, Mich.; Armco Drainage & Metal Products, Inc., Memphis (Columbia Lessors, Inc., Dallas, Texas); Video Independent Theatres, Inc., Oklahoma City, Okla.; Standard Oil Co., Birmingham, Ala.; De Tar Distributing Co., Oklahoma City, Okla.; Bekins Van & Storage Co., Los Angeles, Calif.; Heintz Manufacturing Co., Philadelphia, Pa.; Fitzgerald Baking Co., Columbia Transportation Service, Inc., Cincinnati, Ohio; Alton Box Board Co., Alton, Ill.; Aime Bourgault, Woonsocket, R. I.; Joerns Bros. Furniture Co., Stevens Point, Wis.; North American Van Lines, Inc., Ft. Wayne, Ind.; C & R Transfer Co., Sioux Falls, S. Dak.; Hershey Chocolate Corp., Hershey, Pa.; Consolidated Dairy Products, Inc., Long Island City, N. Y.; B. F. Walker, Inc., Ft. Worth, Texas.

Roadeo Champion Honored

National Truck Roadeo Champion Russell Sheldon, of Motor Cargo, Inc., Milwaukee (center), recently was honored for his contribution to the trucking industry since winning the tandem-axle tractor and semi-trailer roadeo championship in Chicago last October. Shown at left are Owen O. Orr, president of Motor Cargo; Sheldon, and H. R. Stickel, assistant to the president of The White Motor Co., Cleveland. The testimonial included the presentation of a $500 U. S. Bond

(Please Turn Page)

Chuting the News . . .

(Continued from Preceding Page)

Advance Show Registration Breaks All Records; AMHS Completes Handling Conference Plans

Advance registration for the 6th National Materials Handling Exposition indicate attendance of record-breaking proportions. The show will be held this year at the International Amphitheatre, Chicago, May 16-20. Preliminary estimates indicate that it will attract well over 25,000 visitors from all over the world.

Equipment valued at almost $10 million will be transported to Chicago for the event and set up for demonstration in simulated factory and warehouse conditions. Approximately 250 companies will exhibit.

Concurrently with the show, the American Material Handling Society will stage a conference on present-day methods of materials handling. Forty-five leading executives will discuss a total of 29 subjects during the three-day conference sessions. Topics range over a wide field, from warehousing, receiving, and shipping, to equipment ownership vs. leasing; from the relationship of materials handling to plant layout, to the subject of integrating handling systems with plant facilities; from the subject of materials handling from origin to destination, to yard, or bulk, handling.

—DA—

Dr. Frederick to Analyze Cabinet Committee Report

An analysis of the controversial report of the Presidential Advisory Committee on Transport Policy and Organization, prepared by Dr. John Frederick, will appear in the June issue of DA. Dr. Frederick, who is DA transportation consultant, has long been active in government transportation circles.

Maintenance Contest Extension

Trucking companies planning to compete in the Fleet Road Failure and Maintenance Contest, sponsored by the Equipment and Maintenance Council of the ATA, may enter any time during 1955. In announcing that advance entries will not be required, the council said that the reports must cover failures during the full year.

Warehousing and Traffic Coordination

Coordinating warehousing and traffic with materials handling was discussed by George A. Smith (far right), manager, material handling and packaging department, International Business Machines Corp., at the American Management Association's spring manufacturing conference March 28-30 in Chicago. Mr. Smith's presentation was part of a full half-day session featuring the organization of the warehousing and traffic function and its coordination with purchasing, production and materials handling. Also shown above are (l. to r.) Moderator E. Albert Ovens, Academy of Advanced Traffic; Clinton H. Vescelius, Otis Elevator Co.; Stanley W. Burnham, Lehn & Fink Products Corp.; Matthew A. Houston, Chase Brass & Copper Co. The three-day conference attracted more than 400 manufacturing executives to its sessions

Air Freight Agreement

Agency agreement, which will provide the most complete overseas air freight service to shippers along United Air Lines system, is signed by C. L. Gallo (left), president of Air Express International Corp., and R. W. Ireland, vice president-traffic for the airline. Officials say move results in rate savings ranging from 10 to 40 per cent

Legislative Line-Up

Following is a brief summary of legislative items pending in Washington. The status reported is as of April 10.

HIGHWAY CONSTRUCTION—Senate Public Works subcommittee scheduled additional hearings on the Gore bill (S. 1048), the Administration bill (S. 1160), and the Case bill (S. 1573) through mid-April. House Public Works committee set hearings through April 23 on Buckley and Dondero bills, H.R. 4260 and 4261.

HIGHWAY LAWS—House Public Works subcommittee planned another executive session on highway law codification bills (H.R. 234, 235, and 2127).

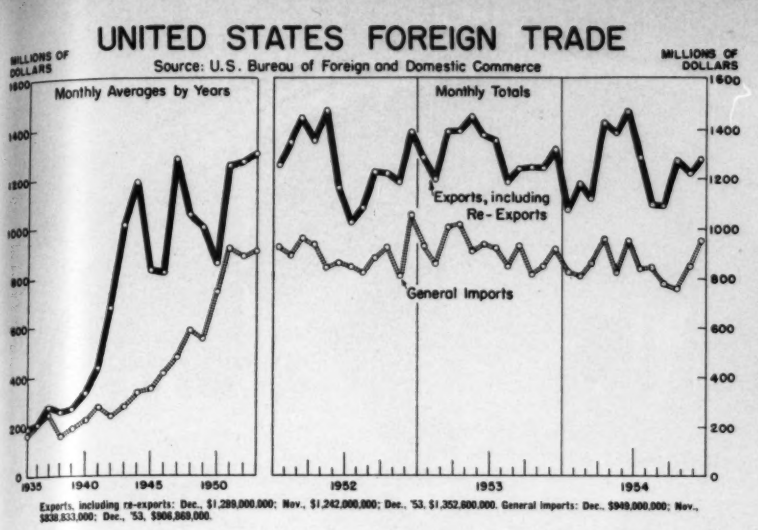
PHANTOM FREIGHT — House Commerce committee scheduled no hearings on the Hinshaw bills (H.R. 528 and 765).

POSTAL RATES — House Post Office committee still holds the Administration postal rate increase bill (H.R. 2988), with no hearings set.

TAXES—H.R. 4259, extending existing excise and corporate tax rates through March 31, 1956, enacted as Public Law 18, 84th Congress.

TERMINAL MARKETS — House Agriculture committee has scheduled no hearings on the Cooley bill, H.R. 4054, to set up modern wholesale markets in cities.

SHIP MORTGAGES — New bill, H.R. 5109, introduced to supersede H.R. 1771. This latest measure would remove certain procedural difficulties in the Ship Mortgage Act so as to facilitate marine mortgage transactions. House Merchant Marine committee has scheduled no hearings.



MHI Names Committees

Robert H. Davies, president of the Material Handling Institute, has named committees for 1955-56. Names of chairmen of the respective committees follow:

MHI-AMHS Cooperation, John A. Baldinger, Automatic Transportation Co.; Educational, Howard M. Palmer, Lewis-Shepard Products, Inc.; Finance and Budget, R. L. Fairbank, Towmotor Corp.; AAR Coordinating, John G. Bucuss, Acme Steel Co.; Exposition and Technical Sessions, George G. Raymond, Jr., Raymond Corp.; Public Relations, S. W. Gibb, C&D Batteries; Planning, C. B. Elledge, General Electric Co.

—DA—

Club Briefs

"The Transportation and Transit Problem—The City's Responsibility" was the subject of a talk by Los Angeles Councilman L. E. Timberlake at the last meeting of the **Los Angeles Transportation Club.**

The **Traffic Club of Chicago** and the **Mid-West Shippers Advisory Board** jointly sponsored a Perfect Shipping Luncheon on April 21. M. M. Cohen, general manager-secretary of the Chicago Regional Port District, spoke on "St. Lawrence—Cal Sag Port."

Warren W. Brown, president of the Monon Railway, was guest speaker at a Railroad Day luncheon April 5 sponsored by the **Traffic Club of Houston.**

John B. Smith, General Electric Co., has been named chairman of the Nominating Committee of the **Newark Chapter No. 39 of Delta Nu Alpha.**

News Briefs

Entries are being accepted for the 5th annual Methods Improvement Competition, sponsored by the **Industrial Management Society** in conjunction with its Time and Motion Study Clinic this fall.

The **Chain Store Traffic League** will conduct its annual meeting May 18-20, at the Hotel Sherman, in Chicago.

Two more essential **United States Foreign Trade Routes** have been approved by Clarence G. Morse, Maritime Administrator.

Nominations have opened for election of representatives to the **National Traffic Committee of the ATA.**

Slick Airways, Inc., and **Airwork Atlantic, Ltd.,** have inaugurated one-plane service from California to Britain, with connections to all principal points in Europe.

The 2nd annual **Michigan Traffic and Transportation Conference** is scheduled for May 11-12, at Michigan State College.

A fourth quarter increase of 3.2 per cent over the same period in 1953 has been reported by the ATA for intercity freight transportation.

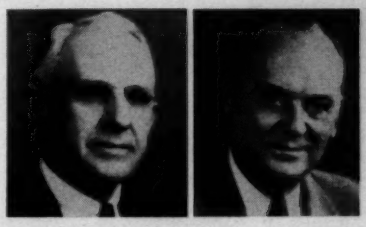
—DA—

The Traffic Managers' Institute graduated 45 at commencement exercises Mar. 17.

Car Loadings

		1955	1954
January	(4 wks.)	2,524,775	2,489,506
February	(4 wks.)	2,575,082	2,461,745
March	(4 wks.)	2,621,087	2,411,886
Total		7,720,944	7,363,137

MEN
IN THE NEWS



Joseph S. Hildreth (left)—elected Chairman of the Board, Chilton Co., publishers of leading trade and business papers, including DISTRIBUTION AGE. Chilton also named **G. Carroll Buzby** (right) as president.

Materials Handling

Phil Norton — appointed executive vice president, Wisconsin Motor Corp., Milwaukee, Wis.

C. Allen Dolby — named general sales manager, Brainard Steel Div., Sharon Steel Corp., Warren, Ohio.

William C. Leingang—named assistant to the president, Exide Automotive Products Div., Electric Storage Battery Co., Philadelphia, Pa.

T. B. Sturges—appointed regional manager for the 10 western states, Lamson Corp., Syracuse, N. Y.

George R. Brockway—new assistant to the president, The Raymond Corp., Greene, N. Y.

Dr. L. E. Lighton—vice president in charge of new research division, Electric Storage Battery Co., Philadelphia, Pa.

Traffic

Joseph A. Illes —named general traffic manager, Norge Div., Borg Warner Corp.

C. H. Kibler—promoted to general traffic manager, Babcock & Wilcox Co. **Neil Robertson**—named assistant general tm.

Charles F. Theobald—new general traffic manager, Robert Gair Co., Inc., New York, N. Y.

Serge Neprash—appointed coordinator of traffic, The Armstrong Rubber Co., West Haven, Conn.

He makes Parker Pens fly with Delta-C&S **airFREIGHT**

"Moving Parker pens to our stores by air is a big help in keeping them moving across our counters at a profit," says Manager J. Lester Longino of Miller's Book Stores, Atlanta.

Miller's is typical of the many dealers that Parker supplies by air in 48 states and 132 world markets from its modern plant in Janesville, Wisconsin. Says Mr. Longino: "When seasonal events or promotions cause a surge in demand, we're ready to cash in *fast*. The small added cost of the average air shipment is often less than we'd lose on the sale of a single pen."

Your dealers' supply source is as near as tomorrow morning when you ship by Delta-C&S, the route that success-story products take to wider markets, bigger sales, lower costs.

SHIP VIA

Delta-C&S airFREIGHT

All Delta-C&S flights carry airFREIGHT

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Washington DA

By Ray M. Stroupe, *Chilton Washington News Bureau*

MAY ACCEPT DECISION—Government attorneys may forego an appeal of the ICC decision that the railroads did not charge excessive rates for moving military supplies in World War II. Freight bill paid by the government was $6.2 billion. ICC says rail carriers' charges were lower than they would have been on commercial shipments because of the special rate quotations permitted by Sec. 22 of the Interstate Commerce Act.

HIGH FEES PROPOSED—Fees outlined in the Case highway bill (S. 1573) would make use of the interstate road system very costly for truckers. This measure, offered as a substitute for the Administration highway bill, would impose charges ranging from $300 to $1200 a year on carriers with a gross weight of more than 20,000 lb. The bill advocates federal-state outlays of some $70 billion for new highways in the next 10 years.

EXTEND SHIP STORAGE—Another 105 ships from the national reserve fleet will be used on the Pacific Coast for storage of government-owned grain. Some 24 million bu will be loaded aboard 30 vessels at Olympia, Wash., and 75 ships at Astoria, Ore. Loading is expected to begin at Olympia in May and at Astoria about June 1. Approximately 30 million bu of wheat are stored now on 130 ships at these two locations.

PARITY PLEA OFFERED — Requested of ICC is consideration of lower transcontinental rail rates on freight bound for Alaska. GSA wants the rates lowered to parity with those on freight going to Hawaii and the Orient. Costs of government shipments could be trimmed by as much as $1 million a year, GSA holds, if Alaskan freight were removed from the domestic rate category.

WEIGH TERMINAL SALE—Both ICC and the Justice Dept. want to know more about the proposed purchase of the Illinois Terminal R. R. by 11 railroads. ICC set a late-April date for further fact-finding hearings at Springfield, Ill. Justice Dept. is curious about possible antitrust aspects of the sale and will present a series of questions to ICC when interested parties file their briefs.

FUEL OUTLAYS DROP—Investment in fuel, materials, and supplies by Class I railroads amounted to more than $1.4 billion in 1954. This total was nearly $500 million lower than that in 1953. The over-all fuel bill dropped last year, though diesel oil outlays rose by $7.5 million to $307.7 million. Iron and steel product expenditures declined from more than $612 million in 1953 to $406 million last year.

MARKS RESEARCH GOALS — Better shipping containers for farm products should be targets of high-priority research. This is a recent recommendation to the U. S. Agriculture Dept. by its Transportation Research Advisory Committee. The group also proposes studies leading to improved motor carrier equipment for perishables and more complete statistics on interstate hauling of livestock by rail and highway.

LOOKS INTO MERGER — Hearings to disclose whether management of the New York, New Haven, and Hartford R. R. is trying to take over the Boston & Maine were held by ICC last month as scheduled. A request by certain B. & M. stockholders to have the inquiry postponed was turned down by Chief Justice Warren. ICC has indicated concern that the alleged merger effort may have violated the Interstate Commerce Act.

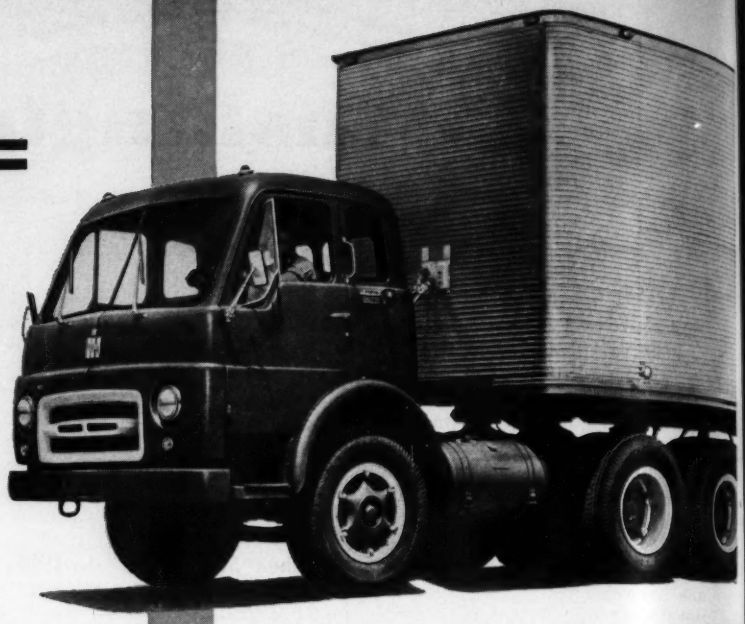
BID ON EXCAVATION—Bids on the biggest excavation job in the U. S. portion of the St. Lawrence Seaway were booked for opening during the first week of May. The work will include removal of 12 million cu yd of earth to make space for the central part of the Long Sault Canal, near Massena, N. Y. This material will be used in construction of 30,000 linear ft of dikes.

LOADINGS TO CLIMB — Current quarter freight carloadings, as anticipated by the Shippers Advisory Boards throughout the country, will increase 7.1 pct over those in the second quarter 1954. Loadings are expected to total more than 7 million cars, as opposed to 6.5 million in comparable months last year. All regions except New England and the Southwest are to share in the increase.

REPORTS NEED STATED—To be retained in existing form is the ICC requirement for accident reports from the trucking industry. The commission says it needs the figures to detect accident trends. However, more lenient rules on preservation of records by the truckers will become effective on June 1. The change is designed to permit truckers to save some $1.3 million annually.

SIGHT BIGGER SALES — Conveyor equipment manufacturers see a fine opportunity for greater sales volume as automation becomes more widespread in American business. They tell federal officials they are looking for ways to expand their market abroad. In addition, they want government assurances that they can keep enough skilled workers and get sufficient raw materials to keep production going in case of war.

COE + 6W = Payload Plus!



INTERNATIONAL leads again, with the profitable answer to the operator with the problem of a heavy payload that must be hauled on the shortest wheelbase!

The answer is a whole new series of all-new INTERNATIONALS that combine the maneuverability of a Cab-Over-Engine, with the payload packing capacity of a 6-wheel model!

The ingenious new INTERNATIONAL counterbalanced cab allows shorter over-all length for given body sizes, means easier maneuvering with short turn-around, less curb, dock or garage space, better load distribution.

Combine this feature with the great INTERNATIONAL bogie for maximum carrying capacity, better flotation on or off the highway. Add such extra values as the famous, proved INTERNATIONAL power divider and third differential.

Then add INTERNATIONAL *all-truck* quality, and you'll agree that the new INTERNATIONAL "Cab-over-6-Wheel" series is the *profit* answer for operators with toughest hauling jobs. See your INTERNATIONAL Dealer or Branch for the model best suited to *your* operation.

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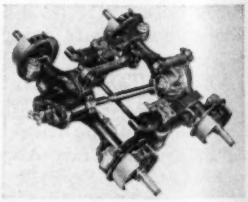

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MAY, 1955
Vol. 54, No. 5

Our Maritime Policy— An Effective Partnership

The Merchant Marine Act of 1936 has created a necessary partnership between private industry and government that permits the development of a privately owned and operated merchant marine capable of competing with foreign fleets

By Alexander Purdon
Executive Director
Committee of American Steamship Lines

THE ROLE of government was described by Abraham Lincoln when he said: "The object of government is to do for the people what needs to be done, but which they cannot do at all, or do as well." Some things are best done by private enterprise, others are best done by government. But in between there is a vast area in which government and industry operate as partners to produce a strong, economical and effective union.

It is on this partnership philosophy that maritime subsidy policy is founded.

Act of 1936

Having tried a number of devices to encourage and maintain a merchant fleet which ranged all the way from outright neglect, our government finally adopted a policy to maintain and support an American merchant fleet. This was done in the Merchant Marine Act of 1936. That Act is the very foundation of our maritime policy and sometimes is referred to as the Magna Charta of the American merchant marine.

After a century of costly trial and error, of experiment and mistake, of neglect and frantic pump priming, we arrived in 1936 at a stage of maritime maturity.

The Merchant Marine Act of 1936 recognized in a realistic manner that construction and operating costs were greater for American-flag ships than for those of foreign registry and established procedures to compensate for the differentials.

Passage of the Act was preceded by almost two years of investigation and debate and full consideration of all prior legislation. Its purpose was "to further the development and maintenance of an adequate and well-balanced American merchant marine, to promote the commerce of the United States, to aid in the national defense."

The Act introduced the sound principle that government aid to achieve cost parity with foreign flag competition was essential on the grounds that anything less would not produce the desired results.

Objectives and Provisions

The Merchant Marine Act of 1936 marked the first attempt by this country to provide direct subsidies designed to establish and maintain an American Merchant Marine. Its expressed objective is to aid and encourage the development of a merchant marine:

1. Sufficient to carry all domestic commerce and a "substantial portion" of the foreign commerce of the United States;
2. Capable of serving as a military auxiliary in time of emergency;
3. Owned and operated by United States citizens; and
4. Composed of optimum vessels, constructed and manned by United States citizens.

For the purposes of this discussion, the Merchant Marine Act had three important provisions:

1. It established the basis for providing operating differential subsidies to be paid by the government to those American-flag steamship lines serving the essential world trade routes, providing they met various requirements.

2. It established the basis for construction differential subsidies to American shipyards.

3. It created the Maritime Administration to administer and control the government aid to American shipping established by the Merchant Marine Act.

In simple terms, operating differential subsidies are paid to qualified American-flag steamship lines that are confronted with

(*Please Turn to Page* 114)

EDITOR'S NOTE: Mr. Purdon's remarks are excerpted from a recent address before a Symposium on Government Aid to Shipping, sponsored by the Propellor Club of the U. S. Port of New York.

Injuries and Accidents In Warehouse Operations

A Department of Labor Survey reveals that the injury-frequency rate in warehousing is approximately double the all-manufacturing industry rate, but warehousing's injury-severity rate is better than in most industries

THE incidence of work injuries in the warehousing and storage industry has been consistently high. In seven of the eight postwar years the injury-frequency rate for the industry, as reported in the annual work-injury summaries of the Bureau of Labor Statistics, has been above 30.

In 1952, the latest year for which final figures are available, the average injury-frequency rate for the warehousing and storage industry was 36.4. This was more than double the all-manufacturing industry average.

Injury Severity

In terms of injury severity, however, the record of warehousing and storage industry is generally somewhat better than that for most industries.

The most favorable injury-severity comparison between warehousing and storage and other industries was found in the occurrence of permanent-partial disabilities. In warehousing operations, 1.7 per cent of all disabling injuries in 1952 resulted in some degree of permanent impairment compared with 5.4 per cent of all-manufacturing.

Furthermore, in a broad comparison of injury severity among industries, the 1952 record showed an average time charge of 50 days per case for all reported injuries and 12 days per case for all temporary-total disabilities in warehousing and storage operations compared with corresponding averages of 85 days and 17 days for all-manufacturing. The standard severity rate, representing the loss to the industry, however, was 1.8 days per 1,000 employee-hours worked in warehousing and storage and 1.3 for all-manufacturing.

Scope of Survey

The warehousing and storage industry, as defined for this study, includes all establishments which provide storage facilities for hire, designated as public warehouses. Private warehouses have been excluded.

The study has been restricted to the experience of inside warehousemen. The experience of highway truck drivers, their helpers, and of other employees who perform the major portion of their duties away from the warehouse has been excluded.

The reporting group included 934 farm-products warehouses, 913 household-goods warehouses, 515 merchandise warehouses, 304 refrigerated and cold-storage warehouses, and 29 miscellaneous firms.

The injury-frequency rate represents the average number of disabling work injuries occurring in each million employee-hours worked. It is computed according to the following formula:

$$\text{Frequency rate} = \frac{\text{Number of disabling injuries} \times 1{,}000{,}000}{\text{Number of employee-hours worked}}$$

The injury-severity rate weighs each disabling injury with its corresponding time loss or time charge and expresses the aggregate in terms of the average number of days lost or charged per 1,000 employee-hours worked. It is computed according to the following formula:

$$\text{Severity rate} = \frac{\text{Total days lost or charged} \times 1{,}000}{\text{Number of employee-hours worked}}$$

Warehouse Hazards

The chance of severely strained muscles from lifting probably is the outstanding hazard to warehousemen. Warehousing operations require a great deal of manual handling even though fork-lift trucks, conveyors, and other mechanical handling equipment are used to considerable extent.

Manual handling operations also result in other types of injuries. Hands or fingers may be lacerated by rough or splintered containers

(*Please Turn to Page* 11)

EDITOR'S NOTE: The complete survey, known as Bulletin No. 1174, Injuries and Accident Causes in Warehousing Operations, is available at 40¢ a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Table No. 1

WORK-INJURY RATES CLASSIFIED BY TYPE OF WAREHOUSE AND OCCUPATION

Type of warehouse and occupation	Number of warehouses	Number of employees	Employee-hours worked (thousands)	Injury-frequency rates at -- All disabling injuries	Deaths	Permanent-partial disabilities	Temporary-total disabilities	Injury-severity Average time lost per -- Disabling injury (days)	Temporary total disability (days)	Severity rate
Total 1/	2,695	31,956	65,095	31.0	0.1	1.3	29.6	71	13	2.2
TYPE OF WAREHOUSE										
Farm products, total	934	8,503	16,258	25.0	.1	1.0	23.9	67	15	1.7
Household goods	913	5,132	10,872	21.0	.2	2.1	18.7	184	15	3.9
Merchandise, total 1/	515	10,201	20,775	33.0	.1	1.3	31.6	64	13	2.1
Canned goods	44	772	1,467	39.5	.7	.7	38.1	119	11	4.7
Flour and grain-mill products	27	641	1,387	26.0	.7	2.2	23.1	322	17	8.4
General	237	4,559	9,310	29.2	–	.8	28.4	46	14	1.3
Refrigerated, total 1/	304	7,278	15,249	39.7	.1	1.0	38.6	39	12	1.6
Food products	262	6,139	12,858	40.9	.1	.8	40.0	37	12	1.5
General	39	1,105	2,318	34.5	–	2.6	31.9	50	11	1.7
OCCUPATION										
Operators, total 1/	3,373	18,713	38,269	40.5	.2	1.6	38.7	75	13	3.0
Compress operators	18	270	561	48.2	–	5.4	42.8	143	10	6.9
Coolerman	64	465	943	85.9	–	1.1	84.8	17	11	1.5
Engineers, refrigerating	249	954	2,164	18.9	.5	1.4	17.0	200	21	3.8
Food processors	41	265	432	13.9	–	4.6	9.3	725	12	10.1
Freezerman	133	782	1,622	61.7	–	–	61.7	10	10	.6
Grain elevatormen	161	406	936	21.4	–	1.1	20.3	28	13	.6
Handlers and stackers	247	1,378	2,851	51.6	–	.4	51.2	36	9	1.9
Ice handlers	93	438	946	76.1	–	–	76.1	14	14	1.1
Order fillers	66	274	550	34.6	–	–	34.6	5	5	.2
Packers and craters	350	1,121	2,330	35.6	.4	3.4	31.8	227	18	8.1
Warehousemen, general	1,939	12,296	24,842	38.2	.2	1.8	36.2	76	14	2.9
Material-movement, total	668	3,263	6,260	36.7	–	1.1	35.6	36	10	1.3
Elevator operators	106	300	630	27.0	–	–	27.0	15	15	.4
Forklift operators	329	951	1,945	26.2	–	2.1	24.1	105	13	2.8
Handtruckers	253	2,012	3,685	44.0	–	.8	43.2	16	8	.7
Other, total 1/	3,085	9,980	20,565	11.8	2/	.6	11.2	79	15	.9
Checkers	443	1,158	2,398	23.4	–	.4	23.0	20	15	.5
Clerical, except checkers	1,306	5,536	11,552	2.0	–	.1	1.9	23	10	2/
Janitors	262	414	790	11.4	–	2.5	8.9	105	7	.12
Maintenance workers	633	1,413	2,927	37.2	–	1.7	35.5	56	13	2.1
Watchmen	366	963	2,049	9.8	.5	1.0	8.3	473	18	4.6

1/ Includes figures not shown separately because of insufficient data.

2/ Less than 0.05.

Table No. 2

WORK ACCIDENTS TO WAREHOUSEMEN,
CLASSIFIED BY HAZARDOUS WORKING CONDITION, UNSAFE ACT, AND TYPE OF WAREHOUSE.

Hazardous working condition and unsafe act	Total – all warehouses 1/ Number	Total – all warehouses 1/ Percent 2/	Household-goods warehouses Number	Household-goods warehouses Percent 2/	Merchandise warehouses Number	Merchandise warehouses Percent 2/	Refrigerated warehouses Number	Refrigerated warehouses Percent 2/
HAZARDOUS WORKING CONDITIONS (216 warehouses)								
Total	1,331	100.0	89	100.0	600	100.0	418	100.0
Hazardous working procedures	316	34.4	28	41.8	138	34.0	93	32.8
Lifting heavy objects	281	30.6	26	38.8	128	31.5	76	26.8
Lifting to high places	26	2.8	1	1.5	6	1.5	15	5.3
Other	9	1.0	1	1.5	4	1.0	2	.7
Defects of agencies	238	26.0	14	20.9	113	27.8	76	26.9
Slippery	75	8.2	4	6.0	22	5.4	40	14.2
Sharp-edged, rough	58	6.3	5	7.4	34	8.4	10	3.5
Improperly designed	44	4.8	1	1.5	29	7.1	8	2.8
Hidden defects, worn	39	4.3	1	1.5	21	5.2	11	3.9
Projecting nails, wires	22	2.4	3	4.5	7	1.7	7	2.5
Improperly guarded agencies	165	18.0	9	13.4	64	15.8	55	19.4
Lack of guardrails, gates	59	6.5	4	5.9	25	6.3	20	7.0
Lack of point-of-operation enclosures	37	4.0	4	6.0	9	2.2	9	3.2
Lack of anchors, locks	34	3.7	1	1.5	18	4.4	11	3.9
Lack of handle guards	15	1.6	–	–	3	.7	10	3.5
Lack of enclosures for gears, pulleys, etc.	13	1.4	–	–	6	1.5	5	1.8
Other	7	.8	–	–	3	.7	–	–
Hazardous arrangement	139	15.2	10	14.9	67	16.5	41	14.5
Unsafely stored or piled	85	9.3	8	11.9	46	11.4	20	7.1
Unsafe layout of operations	41	4.5	1	1.5	18	4.4	14	4.9
Other	13	1.4	1	1.5	3	.7	7	2.5
Poor housekeeping	31	3.4	4	6.0	16	3.9	7	2.5
Lack of personal safety equipment	20	2.2	1	1.5	6	1.5	8	2.8
Other	7	.8	1	1.5	2	.5	3	1.1
Unclassified	415	–	22	–	194	–	135	–
UNSAFE ACTS (245 warehouses)								
Total	1,477	100.0	102	100.0	698	100.0	462	100.0
Using equipment unsafely	424	40.5	31	40.2	187	38.0	142	43.6
Taking wrong hold	183	17.5	16	20.7	77	15.7	56	17.2
Gripping insecurely	159	15.2	11	14.3	74	15.0	48	14.8
Pulling hand trucks	60	5.7	2	2.6	27	5.5	30	9.2
Using hands instead of equipment	16	1.5	1	1.3	7	1.4	6	1.8
Other	6	.6	1	1.3	2	.4	2	.6
Taking unsafe positions	383	36.7	30	39.0	168	34.1	120	36.9
Inattention to footing	161	15.4	15	19.5	72	14.6	46	14.1
Lifting with bent back	61	5.8	4	5.2	27	5.5	22	6.8
Inattention to surroundings	57	5.5	5	6.5	26	5.3	19	5.8
Exposure to moving equipment	29	2.8	1	1.3	9	1.8	13	4.0
Other	75	7.2	5	6.5	34	6.9	20	6.2
Unsafe loading or placing	106	10.1	10	13.0	55	11.2	33	10.2
Failing to secure or warn	50	4.8	4	5.2	33	6.7	11	3.4
Operating or working at unsafe speeds	48	4.6	1	1.3	29	5.9	10	3.1
Failing to wear personal safety equipment	27	2.6	1	1.3	16	3.3	7	2.2
Other	7	.7	–	–	4	.8	2	.6
Unclassified	432	–	25	–	206	–	137	–

1/ Includes figures not shown separately because of insufficient information to classify.

2/ Percents are computed on classified cases only.

Table No. 3

DISABLING WORK INJURIES TO WAREHOUSEMEN OF 274 WAREHOUSES,
CLASSIFIED BY NATURE OF INJURY AND TYPE OF WAREHOUSE.

Nature of injury	Total -- all warehouses 1/ Number	Total -- all warehouses 1/ Percent	Household-goods warehouses Number	Household-goods warehouses Percent	Merchandise warehouses Number	Merchandise warehouses Percent	Refrigerated warehouses Number	Refrigerated warehouses Percent
Total	1,604	100.0	123	100.0	740	100.0	509	100.0
NATURE OF INJURY								
Strains, sprains	543	33.8	43	34.9	252	34.2	168	33.0
Bruises, contusions	475	29.6	29	23.6	212	28.6	169	33.1
Cuts, lacerations	240	15.0	27	22.0	120	16.2	59	11.6
Fractures	230	14.3	21	17.1	112	15.1	63	12.4
Hernias	41	2.6	1	.8	14	1.9	22	4.3
Amputations	18	1.1	1	8	8	1.1	3	.6
Foreign bodies, N.E.C.	16	1.0	–	–	7	.9	5	1.0
Burns and scalds	19	1.2	–	–	6	.8	11	2.2
Other	22	1.4	1	.8	9	1.2	9	1.8

Table No. 4

WORK ACCIDENTS TO WAREHOUSEMEN OF 274 WAREHOUSES,
CLASSIFIED BY ACCIDENT TYPE AND AGENCY OF INJURY.*

Accident type	Total number of accidents	Containers	Vehicles	Working surfaces	Metal parts	Hand-tools	Ice	Lumber	Machines	Furniture	Pallets, skids	Foodstuffs	Other
Total	1,604	484	220	180	108	55	42	42	42	41	33	26	249
Struck by moving objects	490	170	61	14	56	33	24	22	2	10	15	16	67
Falling objects	341	154	14	14	46	4	20	16	2	9	15	16	31
From hands	124	45	8	9	18	1	5	9	2	5	7	9	6
From equipment	93	46	1	–	23	1	5	3	–	3	–	4	7
From piles	75	59	–	–	2	–	–	–	–	1	4	3	6
other positions	49	4	5	5	3	2	10	4	–	–	4	–	12
Hand-operated or wielded objects	75	2	38	–	3	25	–	1	–	1	–	–	5
Flying or thrown objects	35	3	–	–	6	–	1	4	–	–	–	–	21
Power driven objects	15	–	6	–	–	4	–	–	–	–	–	–	5
Other moving objects	24	11	3	–	1	–	3	1	–	–	–	–	5
Overexertion due to	374	226	23	4	22	8	12	9	5	22	7	8	28
Lifting objects	275	181	5	4	21	1	6	8	3	17	4	7	16
Other activities	101	45	18	–	1	7	6	1	2	5	3	1	12
Caught in, on, or between	265	55	106	1	4	6	5	1	16	3	6	–	62
A vehicle and another object	107	2	82	–	–	–	–	–	–	–	1	–	22
Handled objects	60	39	1	1	3	4	1	–	1	2	3	–	5
Moving parts of equipment	55	1	14	–	–	1	–	–	15	–	–	–	24
Other objects	43	13	9	–	1	1	4	1	–	1	2	–	11
Falls	195	1	14	154	1	1	1	1	1	–	2	–	19
To lower levels	112	–	4	96	1	–	–	–	–	–	1	–	10
From vehicles	24	–	1	23	–	–	–	–	–	–	–	–	–
From platforms, scaffolds	21	–	–	21	–	–	–	–	–	–	–	–	–
From piled materials	20	–	1	18	–	–	–	–	–	–	1	–	–
From other elevations	47	–	2	34	1	–	–	–	–	–	–	–	10
On same level	83	1	10	58	–	1	1	1	1	–	1	–	9
Striking against	150	31	16	7	25	7	–	9	18	5	3	2	27
Bumping into objects	96	22	14	1	11	3	–	1	18	3	3	2	18
Equipment	41	–	14	–	–	2	–	–	18	1	2	–	4
Projecting nails, slivers	25	15	–	–	2	1	–	–	–	2	1	1	2
Other objects	30	7	–	1	9	–	–	–	–	–	–	1	12
Rubbing against objects	36	9	1	–	14	4	–	2	–	2	–	–	4
Other	18	–	1	6	–	–	–	6	–	–	–	–	5
Slips and stumbles (not falls)	77	–	–	–	–	–	–	–	–	–	–	–	–
Inhalation, absorption	26	–	–	–	–	–	–	–	–	–	–	–	26
Other accident types	21	1	–	–	–	–	–	–	–	1	–	–	14
Unclassified; insufficient data	6	–	–	–	–	–	–	–	–	–	–	–	6

*Does not include 88 bodily motion accidents, 77 of which were slips and stumbles, not falls.

1 – Includes motor vehicles, powered industrial trucks, and hand trucks.

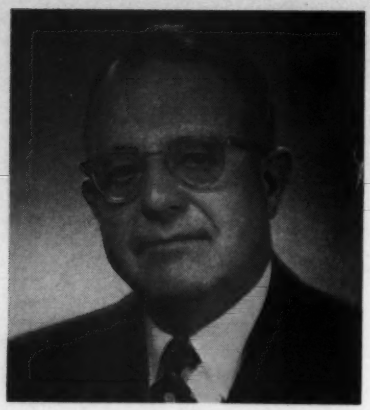
2 – Includes maintenance machinery, refrigerating machinery, production and packaging machinery, etc., and conveyors.

Table No. 5

WORK-INJURY FREQUENCY RATES CLASSIFIED
BY OCCUPATION AND BY TYPE OF WAREHOUSE.*

Occupation	Total – all warehouses	Household-goods warehouses	Merchandise warehouses	Refrigerated warehouses
Total	31.0	21.0	33.0	39.7
Operators, total	40.5	36.3	46.0	47.3
Compress operators	48.2	–	–	–
Coolermen	85.9	–	–	88.5
Engineers, refrigerating	18.9	–	–	19.1
Freezermen	61.7	–	–	60.7
Grain-elevatormen	21.4	–	–	–
Handlers and stackers	51.6	–	28.2	53.4
Ice Handlers	76.1	–	–	76.1
Packers and craters	35.6	36.7	–	–
Warehousemen, general	38.2	36.9	49.7	41.7
Materials movement, total	36.7	–	38.8	44.4
Forklift operators	26.2	–	26.7	–
Handtruckers	44.0	–	57.9	–
Other, total	11.8	2.1	7.2	10.8
Checkers	23.4	–	19.9	42.2
Clerical, except checkers	2.0	1.0	2.8	–
Janitors	11.4	–	7.4	–
Maintenance workers	37.2	–	40.5	30.7
Watchmen	9.8	–	9.1	–

*Farm Products Warehouses (25.0) not included.



I. S. Culver
General President

Clem D. Johnston
AWA's Man of the Year

Man of the Year

A highlight of the 64th Annual Meeting was the presentation of AWA's Man of the Year Award to Clem D. Johnston, "in recognition of his outstanding business statesmanship and public service."

Mr. Johnston, president of the U. S. Chamber of Commerce, once served as AWA president.

Officers Elected at AWA's 64th Annual Meeting

General Offices

President—I. S. Culver, San Francisco, Calif.
Vice President—M. W. Young, San Francisco, Calif.
Treasurer—W. A. Morse, Minneapolis, Minn.

Merchandise Div.

Pres.—R. M. King, Syracuse, N. Y.
V.P.—C. J. LaMothe, St. Louis, Mo.
Treas.—M. A. Buckley, Philadelphia, Pa.
Executive Committeemen—S. J. Beauchamp, Jr., Little Rock, Ark.; A. N. Drake, Newark, N. J.; D. E. Taylor, Seattle, Wash.; D. G. McNeely, St. Paul, Minn.

NARW

Pres.—F. D. Newell, Jr., Minneapolis, Minn.
V.P.—G. J. Stecker, Louisville, Ky.
Treas.—W. E. Ready, Indianapolis, Ind.
Executive Committeemen—J. L. Bear, Wichita, Kan.; Wm. Giacomazzi, Jr., San Jose, Calif.; P. V. Henningsen, Portland, Ore.; S. A. Kadane, Dallas, Tex.

AWA Names Culver Ge

MORE THAN 800 refrigerated and merchandise warehousemen, meeting in Chicago last month at the 64th Annual Meeting of the American Warehousemen's Assn., elected I. S. Culver, of San Francisco, Calif., as general president.

Culver, who is president of Gibraltar Warehouses, succeeds A. B. Efroymson, of Cleveland, Ohio. M. W. Young, retiring president of the National Association of Refrigerated Warehousemen, was elected general vice president, and W. A. Morse was re-elected treasurer. Young is from San Francisco, and Morse is from Minneapolis, Minn.

Joint Meeting

The program included all-industry and individual divisional sessions, with the refrigerated warehouse activity under the chairmanship of Young, and the Merchandise Division sessions under the chairmanship of President R. M. King, of Syracuse, N. Y. For the complete list of new divisional officers, see the box at the top of this page.

Although the meeting was officially scheduled for April 12-16, all officers and many members were on hand several days earlier. Monday and Tuesday, April 11-12, were given to meetings of the Board of Directors and the divisional executive committees. On Tuesday, also, six of the major warehouse sales groups conducted their annual meetings.

Actual meeting activities got underway on Wednesday, April 13. The NARW First Timer Breakfast Wednesday morning featured addresses by Dr. Allen A. Stockdale, billed as the "Pitching Parson," and G. A. Shoemaker, of Elmira, N. Y., who spoke on "It's Your Business—And How." The Merchandise Division First Timer Breakfast was held on Thursday morning.

The AWA Man of the Year Luncheon at Wednesday noon was highlighted by an address by Clem D. Johnston.

Fabulous Future

Speaking on the "Fabulous Future," Johnston lauded the free enterprise system and deplored the practice of government intervention, control, and competition. Also on the program were J. L. Keough, director of Storage, Distribution and Disposal, Office of the Assistant Secretary of Defense, and A. B. Efroymson.

Business sessions on Wednes-

More than 800 merchandise and refrigerated warehousemen gather in Chicago to exchange ideas, elect officers and listen to a corps of experts at the American Warehousemen's Association's 64th Annual Meeting — Clem Johnston named industry's Man of the Year

General President

day morning were devoted to divisional officers' reports, committee round-ups, appointment of special committees, and other items of divisional interest. The NARW also heard reports of various chapter presidents on the state of business in their areas.

C. B. Taylor, of Toronto, Ontario, presented a report of the first Merchandise Warehousing Operating Ratio Study at the Merchandise Division's Wednesday afternoon session. In keeping with this theme, Miss Bertha M. Weeks, director of Record Controls, Inc., Chicago, spoke on "Merchandise Warehousing Records — What to Keep and How Long." Also on the program was F. D. Bateman, of Chicago, chairman of the Government Relations Committee, who spoke on "Our Industry and Government Business."

Wednesday afternoon's NARW meeting was given to a single topic, "Studies of Some Topics Pertaining to Refrigerated Warehouse Construction." H. C. Brown, Jr., Lancaster, Pa., of Armstrong Cork Co., presented late developments in insulation and related factors.

Merchandise Division members played hosts to the NARW on Thursday morning in an all-industry panel type session. Called "Warehousing in the Electronic Age," the morning meeting was divided into three separate panels.

Panel A covered preparation of bills of lading and stock record posting, customer invoicing, and payroll and bookkeeping. Panel B covered the fundamentals of punch card systems, types of machines involved, and application to warehousing. The third panel dwelt on teletype in closed circuit and customer connection, and television in closed circuit. The program was directed by the division's Office Procedures Committee in cooperation with manufacturers of electronic equipment.

The following morning NARW reciprocated by hosting the Merchandise Division in an all-industry session, entitled "Man-Hour Production Idea Clinic." William Dalton, general secretary of AWA and executive vice president of NARW, spoke on "Today's Future and Tomorrow's Man-Hour Problems."

Dalton's talk was followed by a panel discussion on the same subject. The panel was moderated by John Mock, of Evanston, Ill. This NARW-sponsored meeting also featured a showing of the Chamber of Commerce's award-winning film, "It's Everybody's Business."

Management Seminars

Nine management seminars were presented Thursday afternoon in the Merchandise Division gathering. The topics included: Punch card systems, general office machines, teletype and television, office mechanization, advertising media and their effectiveness, profit-sharing plans in the industry, operating ratios, U. S. bonded warehouses and Foreign Trade Zones, and pool car distribution.

On the same afternoon the refrigerated men conducted three panel discussions, heard a report of the Cold Storage Industry Advisory Committee presented by John H. Dean, assistant deputy administrator, Price Supports, USDA, and elected executive committeeman. The three panels covered "Warehouse Operations in Moderate Size Plants," "Engine Room Operations," and "It's Your Business."

Friday afternoon also was devoted to divisional meetings, with the Merchandise group hearing talks on "What's Ahead in Labor," by Ray Bothe, The Employees Assn. of Chicago; "The Warehouseman's Legal and Practical Regulation to Transportation," by John S. Burchmore, Chicago attorney, and "Do You Know Your Liability," by R. C. Schall, St. Paul attorney.

The NARW meeting that afternoon took the form of an Executives' Forum, in which a panel of industry executives discussed finance, labor, research and sales, and other phases of the industry. The forum was moderated by Mr. Mock.

(*Please Turn to Page* 153)

Greetings from Ike

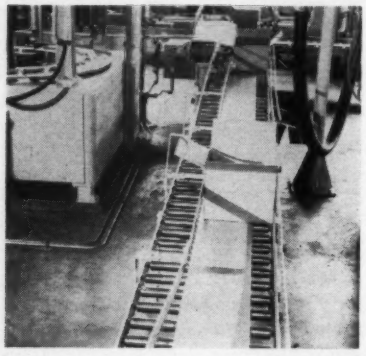
President Eisenhower sent warm greetings to the more than 800 warehousemen assembled in Chicago. His telegram read, in part, "By effectively storing and protecting merchandise, your industry makes possible the enjoyment of more goods by our own people, and facilitates trade with our friends abroad . . . I congratulate you."

NEW PRODUCTS *and* EQUIPMENT

FOR FURTHER INFORMATION USE READERS' SERVICE

Conveyor Line

A line of "automation" conveyor belts, has been announced by **The B. F. Goodrich Co., Industrial Products Div.** The new line features a belt which has excellent resistance to abrasion, oils,

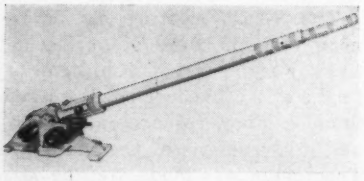


grease, etc. The four new belts in the line have a smooth, easy-cleaning, non-porous surface that resists flaking or checking and eliminates contamination of materials handled. A new color scheme for the belts is said to increase inspection efficiency by reducing glare and eye strain.

Circle 50 on Service Card, Page 33

Strapping Stretcher

A newly developed flat steel strapping stretcher, Model 48,

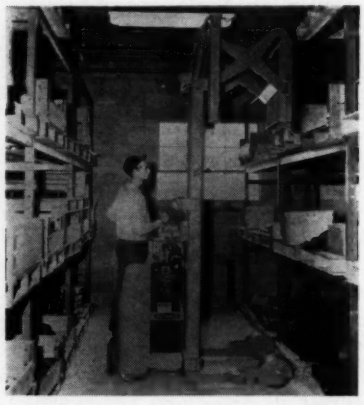


which accommodates 2 in. x .050 steel strapping, has been manufactured by **The Gerrard Steel Strapping Div.** Features include free wheeling of tension drum for easier threading, tension handle repositioning, and extension handle.

Circle 51 on Service Card, Page 33

3,000-lb Capacity

A reach fork truck which can handle 3,000-lb loads, recently has been designed by the **Raymond Corp.** The new model has heavier

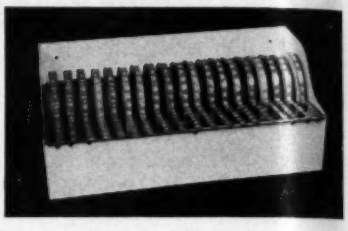


carriage and uprights, larger rams and a revised power unit. The new truck will operate in six-ft aisles and handle pallets or skids of various sizes, as well as operating in bulk storage, rack areas, freight cars and trailers.

Circle 52 on Service Card, Page 33

Multi-Tape Dispenser

A multiple tape dispenser for pressure sensitive tapes has been developed by the **Ruby Products Co.** The unit is 16 x 8½ x 6 in., and has a mandrel capacity of 15½ in. The stationary mandrels are available in sizes of 1-; 1½-; and 3 in. in diameter. Individual rolls of tape turn on the mandrel.

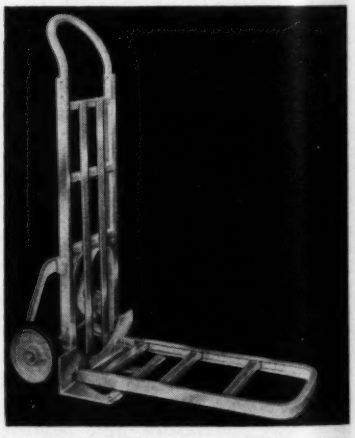


The dispenser will handle various widths of masking and special tapes. It is claimed to be the only dispenser that will hold wide widths of masking tape.

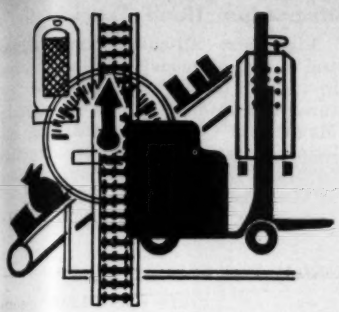
Circle 53 on Service Card, Page 33

Hand Truck Design

A new folding nose-extension on standard hand truck models, has been introduced by **Magline, Inc.** The new unit is constructed en-



tirely of magnesium. When lowered, the unit extends forward beyond the nose, adapting the truck for handling bulky or unusual-



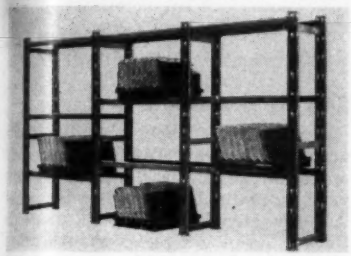
CARD....PAGE 33

shaped loads. When in raised position, the extension rests flush against the side members, allowing the regular nose unit free.

Circle 54 on Service Card, Page 33

Adjustable Racks

Adjustable storage racks with improved design features now are

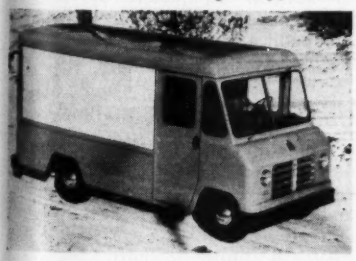


being manufactured by **Palmer Shile Co.** Complete tiering range is possible, using the racks in single, double or multiple sections.

Circle 55 on Service Card, Page 33

Light-weight Body

A newly designed, light-weight body of increased capacity, devel-

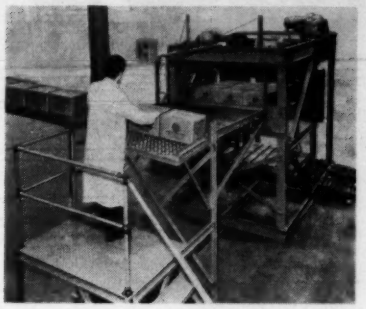


oped especially for specific multi-stop retail delivery operations, will be offered on all nine models of **International Harvester Co's** RM-12, RM-150 and RM-160 series.

Circle 56 on Service Card, Page 33

Pallet Loader

A pallet-loading machine, manufactured by the **J. W. Greer Co.**, is claimed to palletize up to three or more times as many packages and cartons as possible by manual



methods. Advantages include one man operation; minimized handling, and less damage to packages and contents. The unit handles pallets ranging from 32 x 32 in. to 48 x 48 in., and combinations thereof.

Circle 57 on Service Card, Page 33

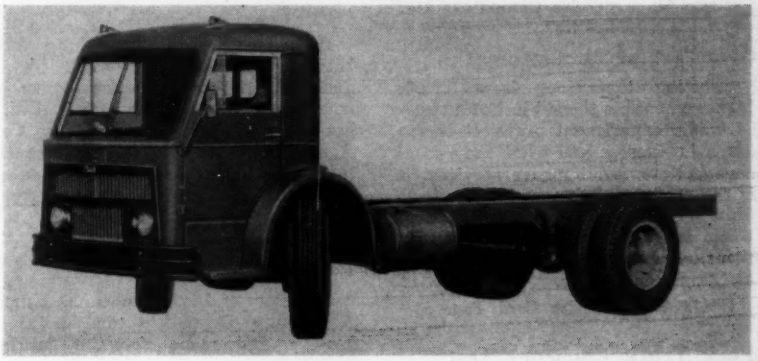
Lift Truck Attachment

A die handling attachment, which can handle up to 6,000 lb, has been introduced by **The Moto-Truc Co.** Four-way entry into

attachment permits loads to be pushed and pulled from the sides as well as from the front. Since the push-pull action is electric and not hydraulic, there are no oil lines to connect or disconnect.

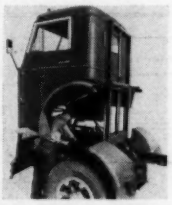
Circle 58 on Service Card, Page 33

Mack Presents New Type COE Truck Series

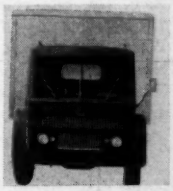


Circle 59 on Service Card, Page 33

Mack Trucks recently announced its has started production of a new type cab-over-engine truck series especially adaptable for city and rural wholesale delivery services. Feature of the new series is a cab that power



lifts vertically from the chassis to provide easy accessibility to the engine. Designated the D Cab-Forward series, the new Verti-Lift models will be produced in truck sizes from 20,000 to 28,000 lb gross vehicle weight, and as tractors in the 40,000 to 53,000-lb gross combination weight range. The units present advanced styling, including the new type cab that is claimed



to be 12 in. shorter than any other COE model now on the market. A specially engineered chassis distributes more of the load on the front axle, permitting greater payloads without overloading axles or tires. Wide doors with low steps permit ease of entry and exit.

FREE Literature

Refrigerated Warehouses

A pamphlet, presenting in questions and answers many unknown facts about the refrigerated warehouse industry, has been published by the **National Association of Refrigerated Warehouses.** The pamphlet will be of service to warehousemen, salesmen, consumers and other interested parties.

Circle 60 on Service Card, Page 33

Pallet Economy

A series of folders from **Pallet Production Co.** outline type of pallets that will prove the most economical in cost, length of use, capacity, and safety. Case histories further illustrate pallet economy experienced by numerous industrial firms and warehouses.

Circle 61 on Service Card, Page 33

Good Traffic Management

"Getting the Most from Traffic Management" is the subject of a study of traffic department practices in Indiana businesses and what they do to save dollars and improve services. It is the product of the combined efforts of the **Indiana University, School of Business** and numerous industrial firms, transportation organizations and traffic managers.

Circle 62 on Service Card, Page 33

Fork Truck Efficiency Test

Preventive maintenance can save many dollars in the operation of materials handling equipment. **Mercury Mfg. Co.** has released a folder titled "Fork Truck Efficiency Test Tells When Corrective Measures Are Needed." All the necessary information is included to determine the condition of the fork truck tested.

Circle 63 on Service Card, Page 33

Care and Storage of Bags

A color presentation entitled "Safe Storage Tips for Multiwall Paper Bags" has been published by **Fulton Bag and Cotton Mills.** In addition to a section on the importance of humidity in storage, the book contains a list of do's and don't's related to moving of bags by hand, hand trucks, and pallets.

Circle 64 on Service Card, Page 33

Warehouse Bookkeeping

A booklet, describing a new bookkeeping machine, has been published by **Remington Rand.** The new machine is designed in relation to warehouse methods and operations. Features include simplified methods, comprehensive analysis, bookkeeping control, and accuracy.

Circle 65 on Service Card, Page 33

LP-Gas Conversion

The **American Liquid Gas Corp.** has published a new brochure which explains in detail the simplicity of converting materials handling equipment to LP-Gas operation, including a recently developed series of conversion kits designed for all type trucks.

Circle 66 on Service Card, Page 33

Shipping Containers

A complete line of packing and shipping boxes, including cases, trays, and pallet boxes, is presented in a new publication offered by the **Rathborne, Hair and Ridgway Box Co.** Available in a variety of models, these boxes are adaptable to any production assembly line.

Circle 67 on Service Card, Page 33

Port of Los Angeles

The **Port of Los Angeles** has issued a brochure which lists port facilities, history and plans for the future, world trade routes which link the port with 250 world ports, a map of the harbor, and other information pertinent to shippers.

Circle 68 on Service Card, Page 33

Literature Round-Up

All items described in this month's issue represent a round-up of brochures, pamphlets, booklets, and leaflets presented here during the past 12 months. If you missed the items the first time around, or if you need additional copies, please circle the appropriate numbers on the Reader Service Card, Page 33.

Magnesium Hand Trucks

Lightness, all-bolted construction and choice of models and accessories in its new hand truck line are featured in a catalog-bulletin released by **Magnesium Co. of America.** The bulletin illustrates design, construction features, and on-the-job applications of the truck line.

Circle 69 on Service Card, Page 33

Safety Practices

Safe and unsafe operational methods for industrial trucks are detailed in literature released by **The Elwell-Parker Electric Co.** Operator training suggestions, safety regulations, and 31 rules for effective, safe operation of trucks also are illustrated and/or discussed.

Circle 70 on Service Card, Page 33

Printed Forms

Milbin Printing, Inc., recently developed a new, up-to-date list of printed forms and advertising pieces, primarily designed for the warehouse and transportation industries. This indexed and alphabetized list is sectioned into categories such as advertising specialties, storage, moving, ICC, motor carrier, accountancy, and office forms.

Circle 71 on Service Card, Page 33

Cost Record Book

A cost record book, permitting the accurate showing of motor truck operation costs for a period of one year, is available on request from the **Autocar Division.** Complete instructions in keeping a record of operating and maintenance expenses also is contained in the book.

Circle 72 on Service Card, Page 33

Payment Plan

Procurement of materials handling equipment on a leasing plan or time payment plan is described in a publication recently issued by the **Towmotor Corp.** It is claimed these plans reduce costs without capital investment. Equipment, service and maintenance data also is included in the publication.

Circle 73 on Service Card, Page 33

Unit Attachments

Ten different model attachments, designed to operate with electric truck and tractor units, is described and illustrated in a new bulletin offered by **The Raymond Corp.** Featured units included the drop bottom box attachment and a power tilt arrangement with tapered chisel forks for handling non-palletized loads.

Circle 74 on Service Card, Page 33

(*Please Turn to Page* 122)

Within the LAW

By Leo T. Parker Legal Consultant, Distribution Age

WAREHOUSING

A holder "in due course" of negotiable receipts can compel warehouse to deliver goods.

Modern higher courts consistently hold that a holder "in due course" of negotiable warehouse receipts can compel the warehouseman to deliver the merchandise represented by the receipts, irrespective of subsequently changed relationship or legal status of the warehouse company, or intermediate parties.

According to a late higher court decision a trustee in bankruptcy is not legally a holder "in due course" of negotiable warehouse receipts, if the testimony shows that the receipts were received from the bankrupt to secure a loan.

For illustration, in N—— Y—— T—— W—— Co. v. B——, 213 Fed. Rep. (2d) 340, the Trustee in Bankruptcy of the D—— P—— Co. filed suit against N—— Y—— T—— W—— Co. seeking to recover damages for the latter's failure and refusal to deliver 224.1 tons of peanuts represented by eleven unredeemed negotiable warehouse receipts issued by the warehouse company.

The counsel for the warehouse company argued that the Trustee was not a holder "in due course" because he had acquired the warehouse receipts from the C—— C—— C—— which had loaned money to the peanut company, and taken the receipts as security. The higher court agreed with this contention, saying:

"We entertain no doubt of the authority of the bankruptcy court to direct the C—— C—— C— —to assign its security to the Trustee. It does not follow, however, that the Trustee thereby attained the status theretofore occupied by C—— C—— C—— of a holder in due course of the negotiable warehouse receipts. To the contrary we think that the rights and title of the Trustee are to be measured by the same principles as apply to other property of the bankrupt estate."

For comparison, see N—— P—— R—— v. F—— & D—— Co., 105 F. (2d) 348, 351, 123 A.L.R. 1352. This court held that a holder of negotiable warehouse receipts is not a holder "in due course" where the testimony shows that the holder was so circumstanced that he transfers the receipt to an innocent third party for value, and subsequently purchases it back for value.

If a contractor installs defective work, he can be made to pay "reasonable" damages.

A recent higher court held that if a contractor installs defective work the amount of damages recoverable by the property owner must be reasonable.

For example, in R—— v. S—— P—— & H—— Co., Inc. 262 Pac. (2d) 1003, the testimony showed that a property owner named R—— was constructing a warehouse building 80 feet wide and 120 feet long. He entered into an oral contract with the S—— P—— & H—— Co. whereby the latter agreed to design, furnish and install a proper and adequate heating system in the building.

The heating plant was installed by the heating contractor and it consisted of a boiler, oil burner, tanks, pipes, ducts, blowers and other installations incident thereto. The heating system as installed did not work satisfactorily and periodically exploded, throwing smoke and soot on the walls of the building and on the merchandise in storage. Complaints were made by R—— and the heating contractor made changes from time to time in the heating plant, but these changes did not remedy the inadequacy of the heat furnished, or cause the system to work satisfactorily. Finally, R—— sued the heating contractor to recover damages for breach of contract. R—— alleged he had paid $4,278.44 on the contract price of $5,991.57; had paid out $3,315.08 in an effort to correct the faulty heating plant; and had suffered a loss of $1,500.00 by damage to his merchandise. He asked for a judgment of $9,093.52. Before the suit was filed R—— installed a coal burning plant at a cost of $2,475.00.

The jury returned a verdict in favor of R—— in the small sum of $2,500.00. It is interesting to observe that the higher court reversed the verdict, and ordered a new trial to determine "reasonable" damage allowance to R——. The court said:

"It is not denied that the heating system failed to function properly and adequately. The measure of damages generally under circumstances such as we find in this case is the difference between the contract price and the reasonable value of the heating system actually installed. In addition, respondent (R——) would be entitled to recover for any special damages sufficiently alleged and proved."

If a carrier fails to object to testimony and charges, he cannot win the legal suit.

In A—— M—— Co. v. N—— P—— R——, 119 N. E. (2d) 88, it was shown that a shipper sued the initial carrier for damage to freight. In the suit the shipper overlooked proving that he was the holder of the receipt of bill of lading, and that the carrier received the shipment at a point within the state for transportation to another point within the state.

However, the carrier's counsel did not object to admission of testimony by the shipper to that effect.

The higher court held the initial carrier liable to the shipper, saying that the original failure of the carrier to object to the procedure rendered same finally valid.

For Additional Information on Distribution Legal Problems, See Letters to the Editor

Warehouse SPOTLIGHT

See Page 30 for AWA Annual Meeting Report

ACW Names Anderson

The American Chain of Warehouses, Inc., elected O. S. Anderson, Kansas City, Mo., president at the annual meeting in Chicago last month. W. C. Hudlow, Jr., of Chattanooga, Tenn., was elected vice president, and J. C. Little, of Little Falls, N. Y., was named treasurer. John W. Terreforte, of New York, was renamed executive secretary.

DSI Re-elects Lownsbury

A. M. Lownsbury, of Cleveland, Ohio, was re-elected president of Distribution Service, Inc., at that organization's annual meeting at the Edgewater Beach Hotel in Chicago last month. R. M. Cornwall, of Salt Lake City, Utah, was named vice president, and S. H. Parker, of Chicago, was named treasurer. J. G. Temple, of Chicago, is secretary.

Movers & Warehousemen's Assn. Meets

Shown above are officers and directors of the Movers & Warehousemen's Assn. of America, assembled in Los Angeles March 22-25 for the organization's 20th Annual Convention. Seated (l. to r.) are: M. J. Arpin, Eastern director; E. J. Starck, Central director; Gladys Theus, Western director; W. C. King, Western vice president; G. T. Howard, Western director; J. O. Delcher, executive vice president; R. H. Eidsvold and A. W. Bueker, Central directors; G. W. Wiederspan, Western director, and S. Kochansky, Eastern director. Standing: L. H. Kleinberg, Eastern director; Sam Cooper and G. Gerold, Central directors; J. W. Engle and R. W. Wilson, Eastern directors; C. Andrews, Western director; J. B. Shelter, Central director; Leland R. Atherton, president; P. Goncz, Eastern director; M. Mollerup, Far Western director; Carroll F. Genovese, executive secretary; John McHugo and A. E. Dean, Far Western director; and H. Stern, Central director. MWA officers report that the 20th Convention was the biggest and best to date, with more than 250 registrants and guests in attendance. Next year's convention will be held in Hollywood Beach, Fla.

Men in the Spotlight

Martin B. Holt—elected president, Draymen's Assn. of Alameda County, Oakland, Calif.

Philip Larner Gore—elected president, Security Storage Co., Washington, D. C. He succeeds **Clarence A. Aspinwall**, who was named chairman of the Board.

Griswold B. Holman, president of George B. Holman & Co.—elected president of the New Jersey Motor Truck Assn.

Phil Martin, Westmont Moving and Warehousing, Ltd., Montreal — re-elected president, North American Van Lines Canada, Ltd.

R. E. Abernathy, president, Interstate Trinity Warehouse Co., Dallas, Texas—appointed to the GSA Advisory Committee on Warehousing.

Walter P. Taylor, Affiliated Warehouse Cos.—named chairman, Warehouse Committee, Chicago Transportation Club.

J. C. Aspinwall, Jr., president of Security Storage & Van Co., Norfolk, Va.—elected president, National Furniture Warehousemen's Assn.

L. M. Bates, Monumental Storage & Carpet Cleaning Co., Baltimore, Md. —re-elected president, Movers' and Warehousemen's Assn. of Maryland.

Charles B. Taxier — joined New Haven Quilt & Pad Co. as special representative to the moving and storage trade.

—DA—

Bekins Van and Storage Co. this spring is celebrating its 60th anniversary.

—DA—

Interlake Re-elects Officers

All officers of Interlake Terminals, Inc., were re-elected at the annual Interlake meeting during last month's AWA convention in Chicago. Officers are: George G. Roddy, president; William G. Tanzer, vice president; Vernon Williams, vice president; Rudie Wilhelm, Jr., vice president, and E. W. Leicht, secretary.

For Additional Warehouse News, See Chuting the News, Washington DA and Within the Law

Allied Renames Leet

W. D. Leet, Chicago, was re-elected president of Allied Distribution, Inc., last month at the annual meeting in Chicago. Other officers named include: James J. Robertson, vice president; William Brown, treasurer, and Miss Leonore Leet, secretary.

Allied also announced the recent addition to its membership of Bekins Van & Storage Co., Merchandise Storage Div., for the State of California; Merchants Warehouse Co., Philadelphia, Pa., and Amarillo Warehouse Co., Amarillo, Texas.

—DA—

Marylaird Walton, of the AWA staff in Chicago, was presented with a watch in Chicago last month at the Annual Meeting of the group. Miss Walton, only the second woman ever to be so honored by the warehousing organization, was cited for 25 years of service.

—DA—

Warehouse Expansion

E. C. Meekins & Sons recently completed a new 38,000-sq ft warehouse and office building in Baltimore, Md. The building is of brick and concrete fireproof construction and is protected by sprinkler, fire alarm, and burglar alarm systems.

King Storage Warehouse, Inc., Syracuse, N. Y., has announced completion of a new Industrial Park Branch. The first unit consists of 32,000 sq ft of steel and masonry construction, and is completely sprinklered and ADT supervised. It has transportation facilities for six railroad cars and 10 trucks. King will continue to operate its main branch in downtown Syracuse, but plans call for future expansion to 100,000 sq ft of floor space in the Industrial Park section.

Hayes Storage Warehouse, Inc., in New York, has been taken over by Cirker's and now is known as **Cirker's Hayes Storage Warehouse, Inc.**

—DA—

United Van Lines has announced a new ocean-van service from the United States to Hawaii, with plans to expand the service to other parts of the world in the near future.

Flower Show Bound

Swinging into the last step of its trip from San Francisco to the California International Flower Show at Hollywood Park, Inglewood, is one of a California Street cable cars, on loan from San Francisco to Los Angeles. It was a feature of the 10-day run of the Flower Show recently and then was on display at the Travel Town in Griffith Park, Los Angeles. Lyon Van & Storage Co. took it on a flat bed truck from the railroad yard to the Flower Show

Phelps Gets New Title

Clyde E. Phelps was elected executive vice president and general manager of Associated Warehouses, Inc., at that group's annual meeting in Chicago April 12. He had served as executive secretary of AWI for the past 17 years.

Other officers elected include: Ward Castle, Chicago, president; A. O. Walde, Los Angeles, Calif., vice president, and W. C. Strobel, Saginaw, Mich., treasurer.

Affiliated Adds Members

Affiliated Warehouse Cos., meeting in Chicago last month, announced the addition of two new member firms: Central Moving & Storage, Inc., San Antonio, Texas, and Easthampton Warehouse Co., Inc., Easthampton, Mass. No change was made in Affiliated's executive personnel, with Walter P. Taylor in the main office in Chicago, and Linne Johnson in the Eastern office, in New York.

The table at right, representing warehouse accidents classified by unsafe acts and activity, was taken from the recently published government survey of accidents and injuries in the warehousing industry. For a complete report on the survey, including six more tables, see Page 28.

WORK ACCIDENTS TO WAREHOUSEMEN OF 245 WAREHOUSES, 1950, CLASSIFIED BY UNSAFE ACT AND ACTIVITY.

Unsafe act	Total number of accidents 1/	Handling materials	Operating or using equipment				Walking, standing, etc.	Other
			Total	Vehicles	Hand-tools	Other		
Total	1,477	848	338	194	91	53	235	7
Using Equipment unsafely	424	268	144	79	35	30	9	–
Taking wrong hold of objects	183	119	61	14	24	23	2	–
Gripping objects insecurely	159	136	16	6	9	1	5	–
Pulling instead of pushing hand-trucks	60	2	58	58	–	–	–	–
Using hands instead of equipment	16	8	6	–	–	6	2	–
Other	6	3	3	1	2	–	–	–
Taking unsafe positions or postures	383	172	85	52	27	6	119	–
Inattention to footing	161	74	10	10	–	–	75	–
Lifting with bent back	61	61	–	–	–	–	–	–
Inattention to surroundings	57	15	29	27	2	–	11	–
Exposure to moving equipment	29	2	10	4	2	4	14	–
Exposure to falling or rolling objects	14	10	3	–	2	1	1	–
Other	61	10	33	11	21	1	18	–
Unsafe loading or placing	106	61	33	29	2	2	7	1
Failure to secure or warn	50	26	4	2	1	1	15	–
Failure to lock or block	29	18	4	2	1	1	6	–
Failure to warn	21	8	–	–	–	–	9	–
Operating or working at unsafe speeds	48	22	13	8	3	2	12	–
Throwing objects instead of passing	19	17	–	–	–	–	2	–
Other	29	5	13	8	3	2	10	–
Failing to wear personal safety equipment	27	15	7	–	6	1	3	–
Other	7	1	3	–	1	2	1	1
Unclassified; insufficient data	432	283	49	24	16	9	69	5

1/ Includes figures not shown separately because of insufficient information to classify.

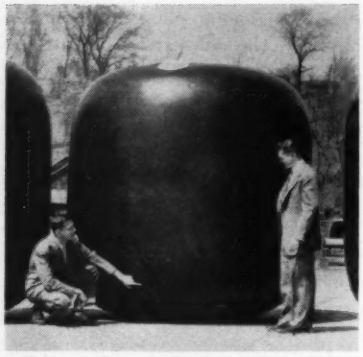
Materials Handling

Equipment Round-Up

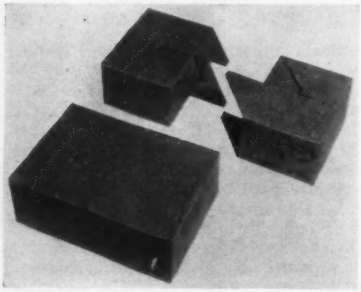
PART I

Containers

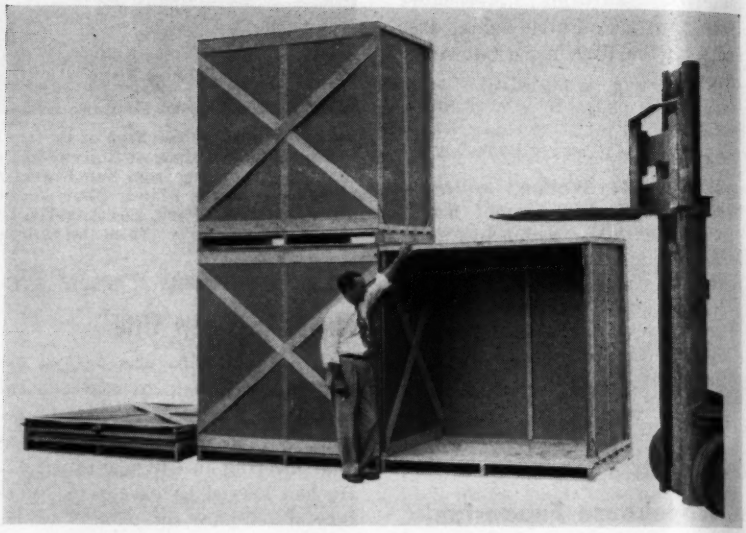
CURRENT efforts to simplify and facilitate handling, storing and shipping have influenced design and construction of cargo containers. Space-saving storage features, the use of synthetic materials and the elimination of nails, screws, etc., in manufacture, exemplify the recent trend.



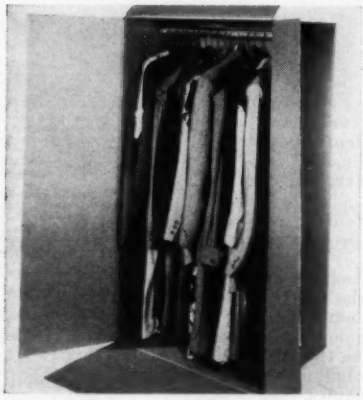
United States Rubber Co.
Bulk handling simplified by use of synthetic rubber and fabric containers, which are collapsible and reusable
Circle 100 on Service Card, Page 33



Hinde & Dauch Co.
New type box is a multiple pack of individual boxes joined by interlocking arms. Units glued by core sealer
Circle 101 on Service Card, Page 33



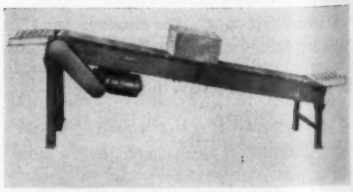
Evans Container Corp.
These containers, used in new method for handling and warehousing household goods, are assembled, locked, and braced in one operation, and the use of nails, screws, etc., is eliminated. Multiple stacking a feature
Circle 102 on Service Card, Page 33



Pak-Rak, Inc.
Front-loading corrugated wardrobe features dust-proof protection, as well as collapsible construction
Circle 103 on Service Card, Page 33

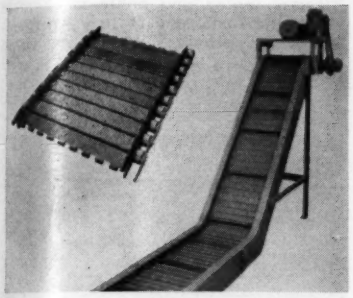
Conveyors

PORTABILITY describes a development of increased importance in the conveyor field. Magnesium and other light-weight materials are construction features. New types of belt construction now in use are providing durability and service. A unique development is a self-contained, flexible unit that compensates for floor dips.

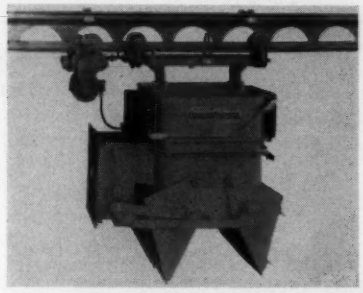


Lamson Corp.
Self-contained, unit booster can be incorporated into a conveyor system or installed for special purpose jobs. Can be used for inclines up to 30 deg
Circle 104 on Service Card, Page 33

Multi-operation units, single control devices, plus light-weight construction, are features representative of the progressive developments introduced in this handling equipment review

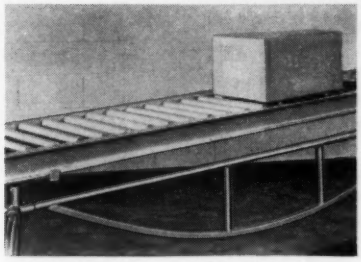


May-Fran Engineering Co.
Hinged-steel belt featuring dimpled surface, designed to eliminate discharge problems from use of flat-surface belts
Circle 105 on Service Card, Page 33

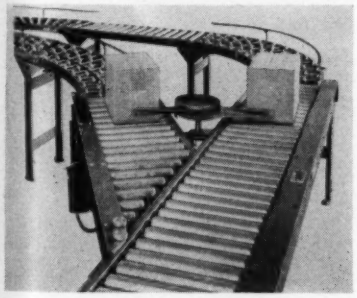


Cleveland Crane & Engr. Co.
Traveling bucket, powered by tractor drive, is used for handling dry granulated materials and moist mixtures
Circle 108 on Service Card, Page 33

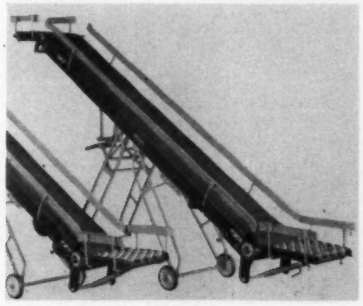
The B. F. Goodrich Co.
Rubber conveyor belt, with high tensile steel wire inserts, guards against rips in severe belt service
Circle 106 on Service Card, Page 33



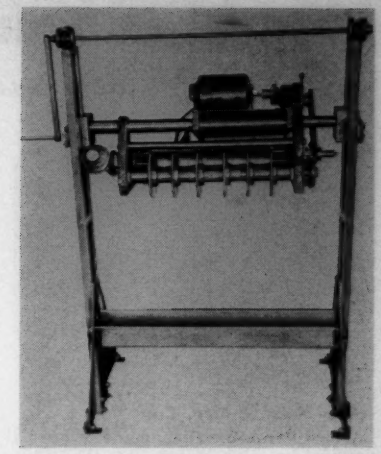
Magline, Inc.
New magnesium roller, portable conveyor claimed to weigh up to 40 per cent less than comparable equipment
Circle 109 on Service Card, Page 33



Standard Conveyor Co.
Merger unit features arm position for use on parallel lines, converging units and right angle transfers, using belts, live rollers, or gravity conveyors
Circle 107 on Service Card, Page 33



Arrow Products, Inc.
Portable power belt conveyor units used as booster in gravity conveyor, or stacker in warehouse operations
Circle 110 on Service Card, Page 33



Potdevin Machine Co.
Palletizing aid for use with conveyors features adhesive operation to prevent package shifting on pallets
Circle 111 on Service Card, Page 33

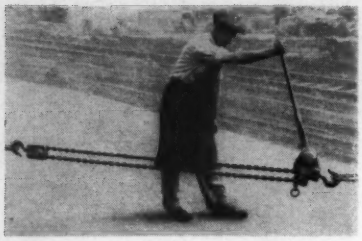
Cranes & Hoists

HANDLING efficiency, compact design, increased capacities and greater lift power while using light-weight metals, continue to be leading objectives in the design of cranes and hoists. A revolving electric fork-lift suspended from an overhead trolley on the crane bridge, is representative of the various attachments developed to meet special handling problems.

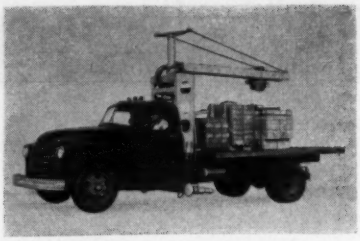
Coles Cranes, Inc.
New crane designed to lift four tons at 10-ft radius, and includes gas-electric operation. Unit measures 7′ 6″ x 11′ 6″
Circle 112 on Service Card, Page 33

. . . Equipment Round-Up

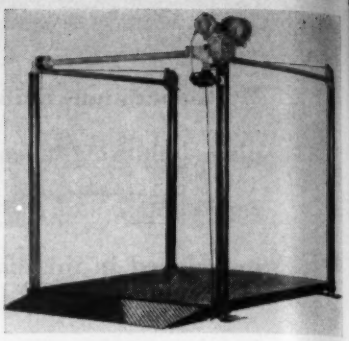
(Continued from Preceding Page)



Ohio Hoist & Mfg. Co.
A new five-ton puller, made of special aluminum alloy, weighs less than 60 lb, yet has the required six-ft lift feature
Circle 113 on Service Card, Page 33



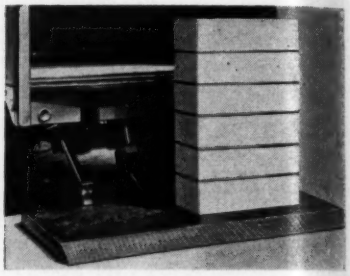
Truck-Crane, Inc.
Unit will lift up to 5,000 lb at one time, and spot it anywhere desired within a 16-ft, 280-deg radius of the truck
Circle 114 on Service Card, Page 33



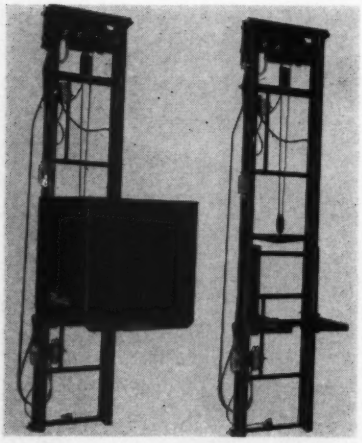
Globe Hoist Co.
Electric motor and cable mechanism raises platform to 5 ft 10⅜ in. Loading slope provided by 24-in. ramp
Circle 117 on Service Card, Page 33

Elevating Equipment

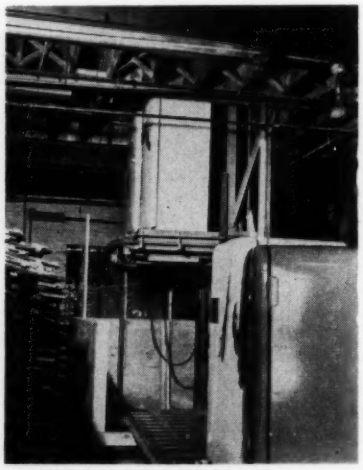
PORTABLE unit design still is a leading concern in the application of elevating equipment. Simplification of mechanisms, operational control devices and ease of installation also are prevalent factors. One manufacturer claims an operating cost reduction of 50 per cent by the use of a new type elevating end gate. Increased lift speeds and capacities are the trend.



St. Paul Hydraulic Hoist Co.
New elevating end gate claimed to reduce delivery cost and handling expense to 50 per cent. Handles up to 2,000 lb
Circle 118 on Service Card, Page 33

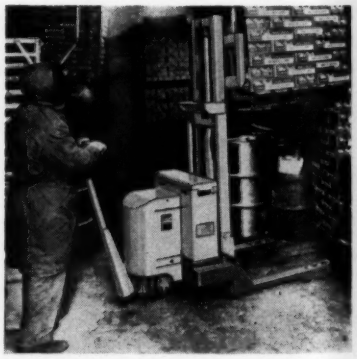


Rapids-Standard Co., Inc.
New lift unit available with platform for use within one floor, with cab for mounting for between-floors use, or for handling between conveyor levels
Circle 115 on Service Card, Page 33



West Bend Equipment Co.
Freight platform raised or lowered 39 fpm. Capacities range up to 4,000 lb. Unit can be moved to any location
Circle 116 on Service Card, Page 33

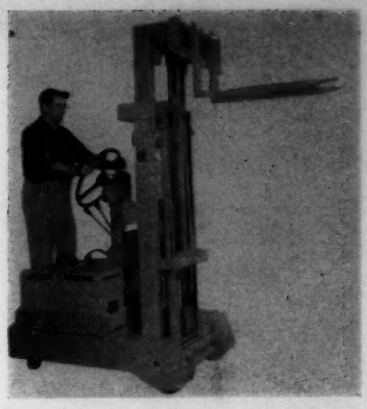
Fork Trucks



Lift Trucks, Inc.
Hydro-electric truck with 60-in. lift designed to operate in close quarters with low headroom, as well as to operate at below-zero temperatures
Circle 119 on Service Card, Page 33

FORK TRUCKS (Continued)

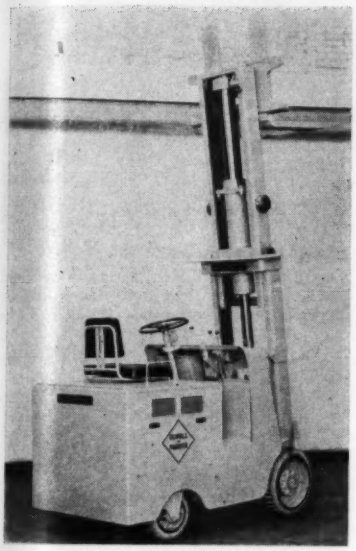
UNITS designed to effect low overhead clearance, as well as operate in close quarters, show a marked trend in the manufacture of gas and electric fork trucks. Greater lifting range and increased capacities are important features of the diesel-electric, straight diesel, L-P gas and gasoline-electric power units. Trucks of corrosion-resistant construction are being offered for efficient operation at below-zero temperatures. A general reduction in truck width and length specifications, affording greater maneuverability and narrow aisle operation, also is noted.



Market Forge Co.

Stand-up unit measures 31 or 42 in. in width and 58¾ in. in length, not including forks. Turning radius 52 in.

Circle 124 on Service Card, Page 33



Elwell-Parker Electric Co.

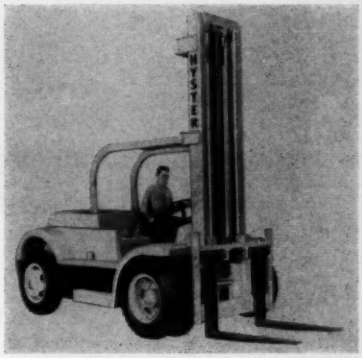
5,000-lb unit features contractor controls, worm drive, caster trail axle, unit assemblies, and rocker arm tilt

Circle 120 on Service Card, Page 33

Baker-Raulang Co.

New steering geometry and anti-friction bearings inhibit wheel scrubbing. Two speeds in both forward and reverse

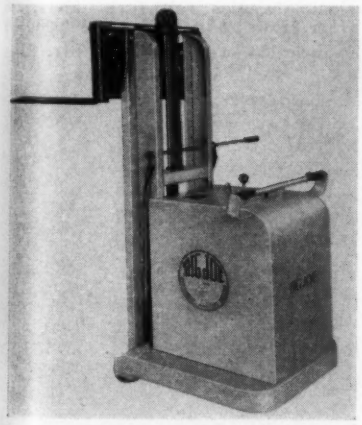
Circle 122 on Service Card, Page 33



Hyster Co.

New 15,000-lb capacity lift truck is claimed to have the shortest overall length and narrowest width in its field

Circle 125 on Service Card, Page 33



Big Joe Mfg. Co.

Design of hand-propelled, hydraulic lift unit eliminates front straddles; provides unobstructed load approach

Circle 121 on Service Card, Page 33

Yale & Towne Mfg. Co.

2,000-lb, high power-weight ratio truck can negotiate right angle corner in a 57-in. aisle or right angle stack in 112-in. aisle. Overall length 72 in.

Circle 123 on Service Card, Page 33

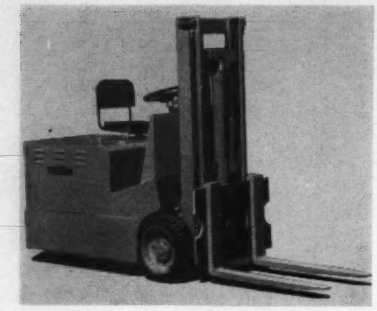
Kwik-Mix Co.

20 per cent increase in lifting range claimed for new Moto-Bug fork lift unit. Lift limit increased to 6 ft

Circle 126 on Service Card, Page 33

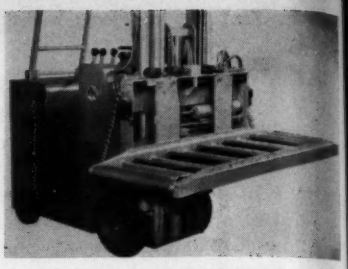
. . . Equipment Round-Up

(Continued from Preceding Page)



Mercury Mfg. Co.
New truck has higher for elevation, increased travel and hoist speeds, shorter turning radius, and will right angle stack in narrower aisles
Circle 127 on Service Card, Page 33

Automatic Transportation Co.
Low-profile Skylift compared against shadow of conventional truck. Operator's head is below tops of fork masts, 68 in. above ground, for low clearance
Circle 128 on Service Card, Page 33

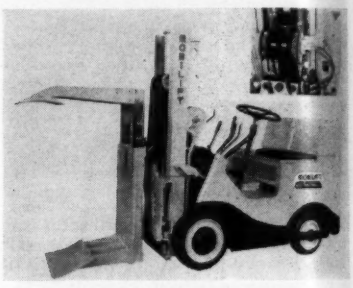


Lewis-Shepard Products, Inc.
Material can be placed on and removed from racks with this side-loading attachment. Rollers are 24½ in. long
Circle 131 on Service Card, Page 33

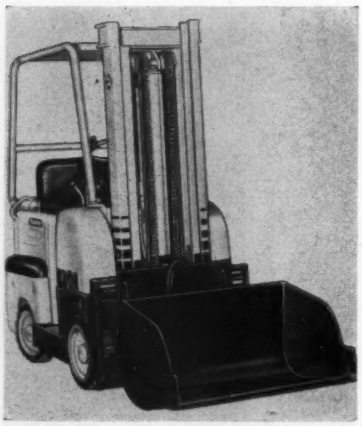
Elwell-Parker Electric Co.
Designed for handling loads without pallets. Attachment mechanically pushes loads off the truck's forks
Circle 132 on Service Card, Page 33

Fork Truck Attachments

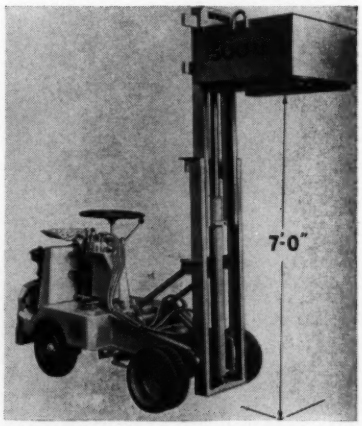
VERSATILITY of fork trucks is largely attributed to the ever-increasing line of attachments. Clamps, scoops and loaders, as well as a side-shift handling device that uses thin paper pallet sheets in place of fork entry type pallets, are included in the current scope of the attachment line.



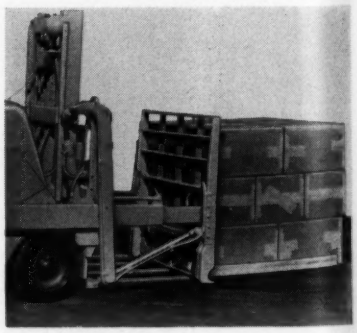
Lamson Mobilift Co.
New combination side shifter and clamp handles roll form materials from 32 to 52 in., and up to 3,000 lb
Circle 133 on Service Card, Page 33



The Buda Co.
Spark-proof feature eliminates hazards due to electrical sparks. Electric controls are not used in the trucks
Circle 129 on Service Card, Page 33



Kwik-Mix Co.
This new unit is rated to lift its maximum ¾-ton load to a height of seven ft in 14 sec. Adjustable forks
Circle 130 on Service Card, Page 33

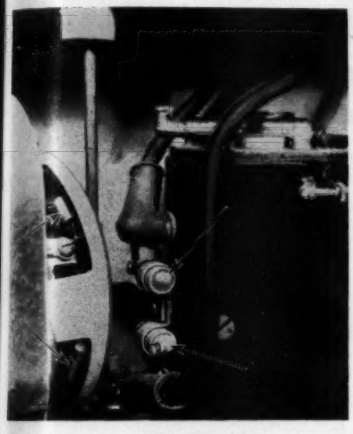


Towmotor Corp.
Device adjusts forks sideways; loads and unloads material, using thin paper pallet instead of fork entry type
Circle 134 on Service Card, Page 33

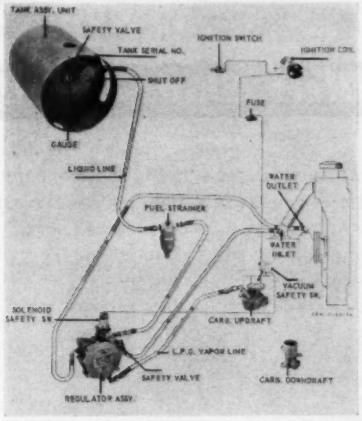
Parts & Accessories

IMPROVEMENTS in parts and accessories play a vital role in the efficient operation of all types of powered industrial trucks. Conversion kits for power adaptation, new plastic-cased batteries, and a radio interference suppression unit for electric trucks, are important developments in this field.

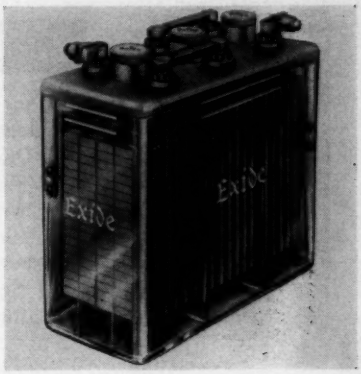
Clark Equipment Co.
Catalytic exhaust oxidizes more than 95 per cent of carbon monoxide and hydrocarbons in engine exhaust
Circle 137 on Service Card, Page 33



Yale & Towne Mfg. Co.
Truck accessory suppresses interference in radio, radar, etc., caused by sparking in battery-power units
Circle 135 on Service Card, Page 33



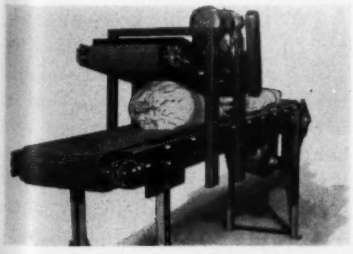
Clark Equipment Co.
Gas-powered trucks can be adapted to liquefied petroleum gas power by installing conversion kit unit
Circle 136 on Service Card, Page 33



Exide Industrial Div.
Polystyrene, a clear, heat resistant plastic, was selected for container and cover of new battery unit
Circle 138 on Service Card, Page 33

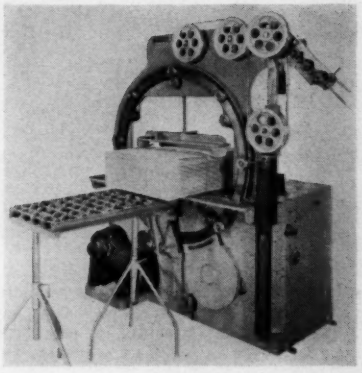
Packaging Aids

THERE has been a rapid advancement in the design of packaging aids and devices. Portability, compactness and push-button control, are features of the variety of machines designed to perform a multiplicity of packaging jobs in a single operation.



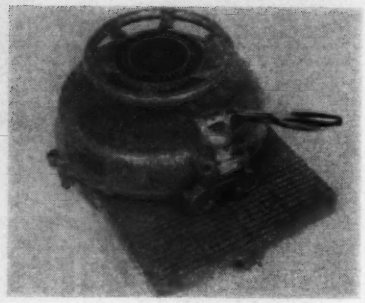
Rapids-Standard Co., Inc. (Left)
Bag Flattener kneads and flattens filled multiwall sacks, removes air and distributes material in the sacks
Circle 139 on Service Card, Page 33

Inland Wire Products Co. (Right)
Adjustable mechanism of wire tying machine allows maximum work space. Automatic wire tension control
Circle 140 on Service Card, Page 33

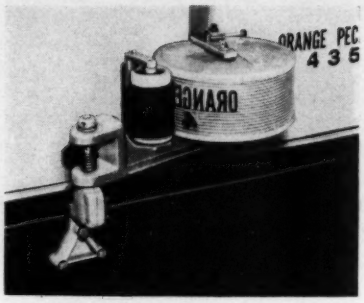


. . . Equipment Round-Up

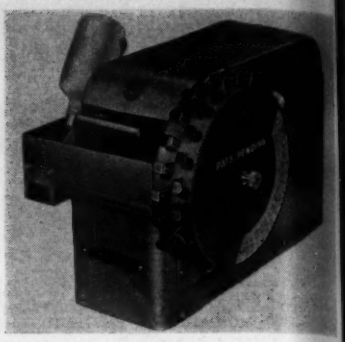
(Continued from Preceding Page)



Diagraph-Bradley Industries, Inc.
¼-in. stencil cutting unit cuts 10 lines, 48 characters per ft, on any weight stencil board and soft metals
Circle 141 on Service Card, Page 33



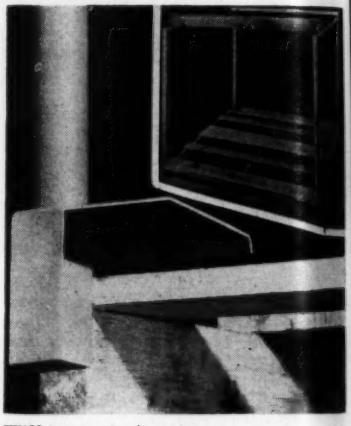
Adolph Gottscho, Inc.
Rotary, friction-driven case marker, attached to conveyor, imprints code-dates, lot numbers, on cases, etc.
Circle 142 on Service Card, Page 33



Ideal Stencil Machine Co.
Automatic, electric Clip-A-Tape cuts tape to any length from three to 10½ in., moistens and delivers it at touch of a button. All widths can be used
Circle 143 on Service Sard, Page 33

Pallets, Skids & Dollies

NOTABLE developments continue in the field of expendable pallets. One unit consists of a paper sling fitted with paper tubes, into which forks can be inserted. No thicker than heavy wrapping paper, the pallet is particularly adaptable to loading and unloading freight cars and motor trucks. A new aluminum alloy is being used in the development of light-weight, extruded skid structures to facilitate handling of heavy equipment.



Wilkinson & Associates
Unit converts standard pallets into rigid stacked storage units. Supports stacked load with no waste space
Circle 146 on Service Card, Page 33

American Cyanamid Co.
Paper pallet consists of paper sling fitted with paper tubes. New type bayonet forks attachable to any truck
Circle 144 on Service Card, Page 33

Equipment Mfg. Co.
Stacking pallet handles cylindrical shapes that stand on end. Access provided for 4-side lift truck handling
Circle 145 on Service Card, Page 33

Racks

MAXIMUM storage capacities in minimum space requirements spell the trend regarding the design and construction of new type racks. A conveyor rack handling device, combining gravity wheel track, rack components and gravity force, efficiently moves and stores materials.

Borroughs Mfg. Co.

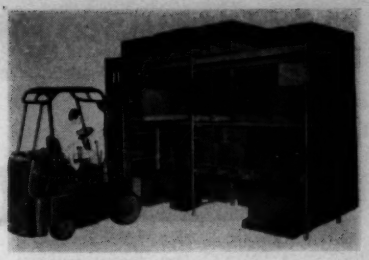
Steel shelving makes each unit complete within itself. Any shelf can be moved without disturbing other units

Circle 147 on Service Card, Page 33

Rapids-Standard Co., Inc.

Conveyor rack combines gravity wheel track, rack components, and gravity force. Unit is entirely portable.

Circle 148 on Service Card, Page 33



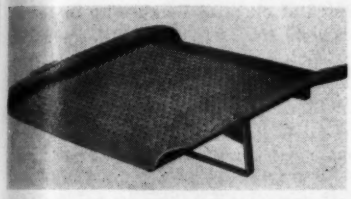
Brainard Steel Div.

Pallet rack has one basic part—a tubular steel frame. Shelving bars and connectors give slip-fit connection. Can be erected 2, 3, or 4 pallets high

Circle 149 on Service Card, Page 33

Ramps & Dockboards

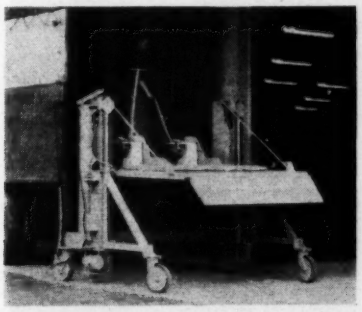
LIGHT-WEIGHT construction, new safety features and increased capacities seem to dominate unit construction. A new, dual-jack hydraulic lift raises loads from floor to trucks or different floor levels. When lowered, the lift becomes part of the floor and can be trucked over.



Magnesium Products of Milwaukee

Adjustable position lock permits magnesium ramp to be used for both truck and rail docks. 3-in. ramp adjustments

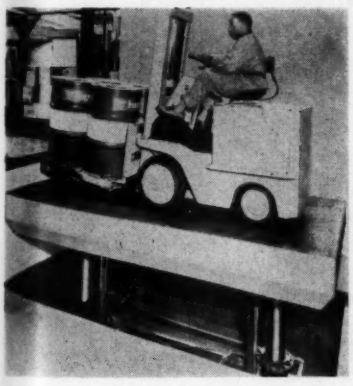
Circle 150 on Service Card, Page 33



Raymond Corp.

Elevating platform of 6,000-lb capacity portable loading dock is operated hydraulically. Will raise loads to 56 in.

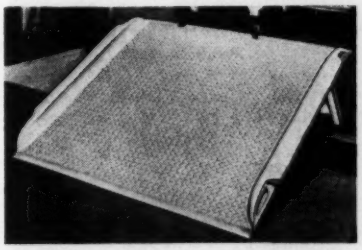
Circle 152 on Service Card, Page 33



Rotary Lift Co.

Dual-jack hydraulic lift capable of handling 12,000-lb loads. The lift, as part of the floor, can be trucked over

Circle 151 on Service Card, Page 33



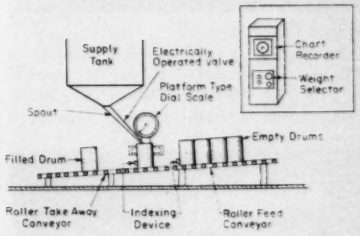
Magline, Inc.

Magnesium dock board equipped with safety curb which cannot be damaged by power truck wheel rims. Units are built to handle loads up to 20,000 lb

Circle 153 on Service Card, Page 33

Scales

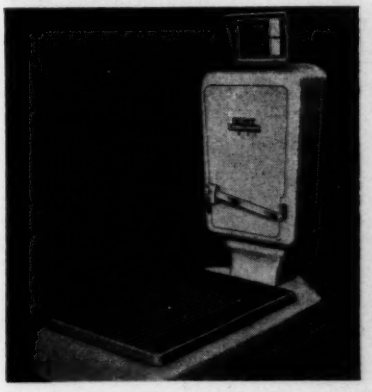
A NEW automatic tare-weighing system, claimed to eliminate the smallest overages and underages, and units featuring projection-type weight indication, accuracy and mobility, describe a few of the numerous developments.



Richardson Scale Co.

New automatic tare-weighing system claimed to eliminate smallest overages and underages in handling

Circle 154 on Service Card, Page 33



The Howe Scale Co., Inc.

Automatic unit features projection type of indication, and incorporates use of a precision chart on microfilm

Circle 155 on Service Card, Page 33

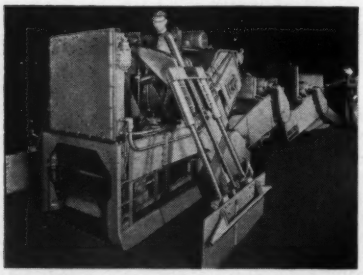
. . . Equipment Round-Up

(Continued from Preceding Page)

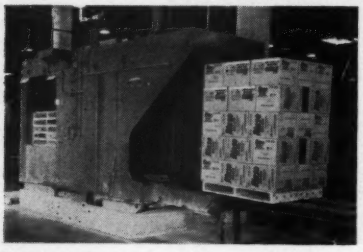
Special Equipment

AMONG the many unique types of handling equipment, is a new automatic pallet loader which makes possible the use of two-way pallets with pick-up openings facing the side. A 2,000-lb capacity lift truck carried behind a transport truck affords speedier moving and storing of loads, while a special box car unloader has been designed having a capacity of 10,000 bushels of free-flowing bulk material an hour.

Hyster Co.
2,000-lb lift truck carried behind a transport is claimed to permit speedier moving and storing of all loads
Circle 156 on Service Card, Page 33



Cargo Handlers, Inc.
Handling unit, with a capacity of 10,000 bu of grain an hour, used unloading bulk material from box cars
Circle 157 on Service Card, Page 33



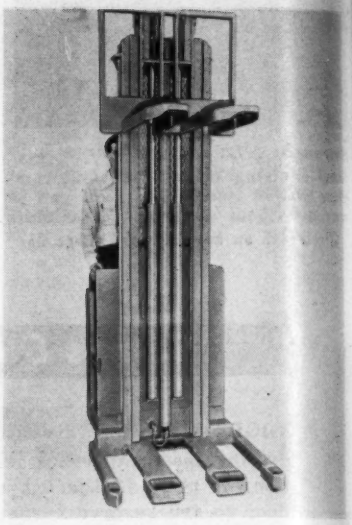
Lamson Corp.
Automatic pallet loader with a side pallet magazine handles up to 48-in.-wide pallets. Two-way pallets used
Circle 158 on Service Card, Page 33

The American Bailer Co.
Palletizing press design involves placing bands firmly around load, attach clips, while platen exerts pressure
Circle 159 on Service Card, Page 33

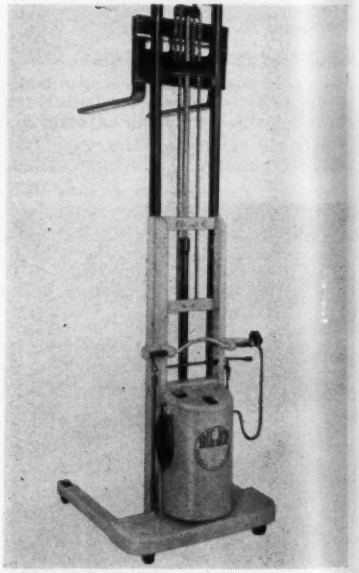
Engineering Products Co., Inc.
Double trackage system for moving skids and pallets. Flat-bottom dolly, pushed by one man over track rollers
Circle 160 on Service Card, Page 33

Stackers

DUAL-PURPOSE units, greater reach and narrow aisle operation are leading features of current stacker models. A new walkie-type electric stacker, with travel, steer and lift controls mounted in a control box, speeds handling of materials.



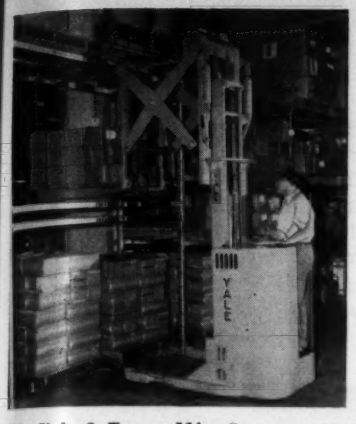
Raymond Corp.
Stacker right-angle stacks in aisle six ft wide. Maximum stability provided at elevated heights up to 158 in.
Circle 161 on Service Card, Page 33



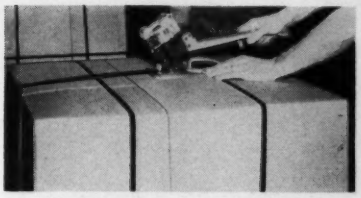
Big Joe Mfg. Co.
Telescopic, battery-operated lift designed for in-between handling, has a stacking height of 110 inches
Circle 162 on Service Card, Page 33

Strapping

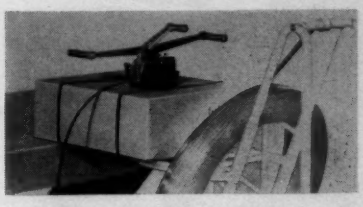
MANY new types of strapping machines and methods have been presented; including units offering multi-job performance with single lever control. One machine tensions strapping, cuts to exact length, and effects an interlocking of overlapping ends.



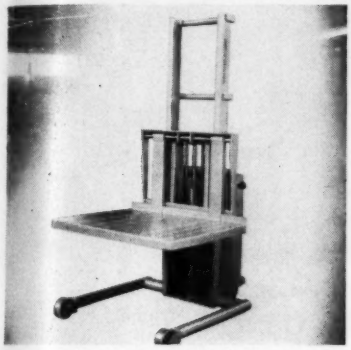
The Yale & Towne Mfg. Co.
Unit operates in 7-ft aisle, picks up and deposits loads without straddling pallets or skids. 2,000-lb capacity
Circle 163 on Service Card, Page 33



Signode Steel Strapping Co.
Packing method utilizes eight units of fibreboard sheets, when assembled act as outer pack to smaller packages
Circle 166 on Service Card, Page 33



Inland Wire Products Co.
Dual purpose machine tensions and cuts strapping; effects mechanical interlocking of the two overlapping ends
Circle 167 on Service Card, Page 33



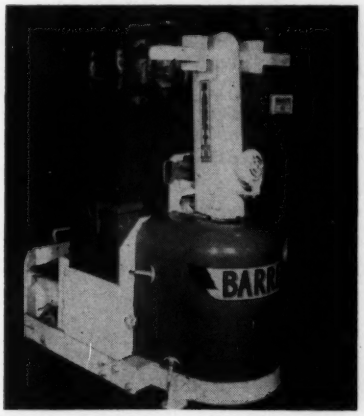
Lewis-Shepard Products, Inc.
Electro-hydraulic stacker used where operations require both platform and forks. 30-in. forks handle pallets
Circle 164 on Service Card, Page 33

Tractors

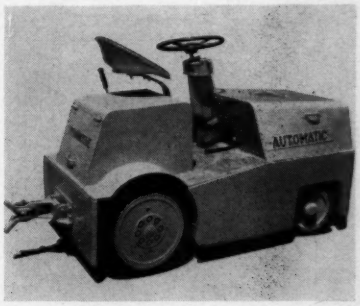
PRODUCTIVE capacity of a new tractor unit recently introduced has been increased from 50 to 100 per cent. Sit-down type, walkies, and radio remote control models, including many with push-button and dual-trigger controls, are available.

Mercury Mfg. Co.
For use in trackless train system, tractor has outside turning radius of 62 in. 2,300 and 3,000-lb drawbar pull
Circle 169 on Service Card, Page 33

Revolvator Co.
Mast of 2,000-lb capacity, portable elevator telescopes to 68 in., and forks operate from 2½ in. to 85 in.
Circle 165 on Service Card, Page 33



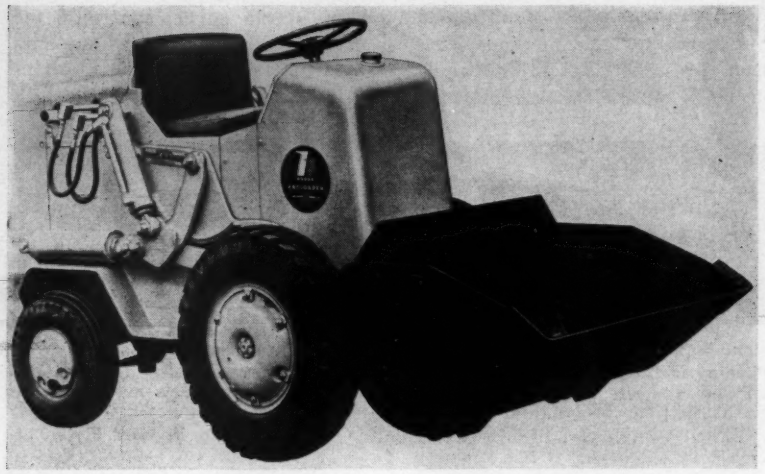
Barrett-Cravens Co.
Battery-powered unit has 200-lb rate drawbar pull at 3¼ mph; as well as a speed of 3¼ mph with 10,000-lb load
Circle 168 on Service Card, Page 33



Automatic Transportation Co.
Length of gas-powered unit with electric transmission is 78¼ in. less coupler. 5-in. grade under clearance
Circle 170 on Service Card, Page 33

. . . Equipment Round-Up

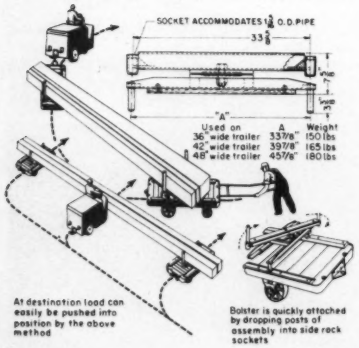
(Continued from Preceding Page)



The Frank G. Hough Co.
The smallest unit in the Payloader line can be operated into and out of box cars with ease. New bucket arm design permits break-out action of the bucket and 40 deg of tipback. Heaped loads carried at lower level
Circle 171 on Service Card, Page 33

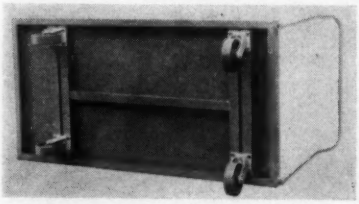
Trailers

NEW type trailers, many for use in overhead and in-floor truck dragging systems, have been introduced. A unique swivel bolster assembly has been developed to move long loads through narrow openings and around corners.


SOCKET ACCOMMODATES 1½ O.D. PIPE
33⅝
"A"
Used on A Weight
36" wide trailer 33⅞" 150 lbs
42" wide trailer 39⅞" 165 lbs
48" wide trailer 45⅞" 180 lbs
At destination load can easily be pushed into position by the above method
Bolster is quickly attached by dropping posts of assembly into side rack sockets

Mercury Mfg. Co.
Lengthy loads supported by swivel bolster assemblies can be snaked through doorways and around corners
Circle 172 on Service Card, Page 33

Lewis-Shepard Products, Inc.
Dragline truck features adjustable drop pin. Steel protection for deck on all 4 sides. Rubber tired wheels
Circle 173 on Service Card, Page 33

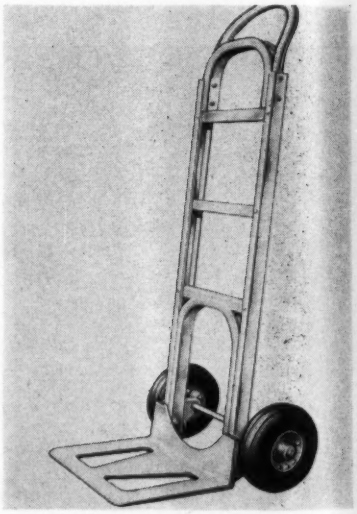


Bacon Metal Products Co.
Features of the all-steel unit include inner chassis, one-piece deck, removable handles. Capacity: 400-8,000 lb
Circle 174 on Service Card, Page 33

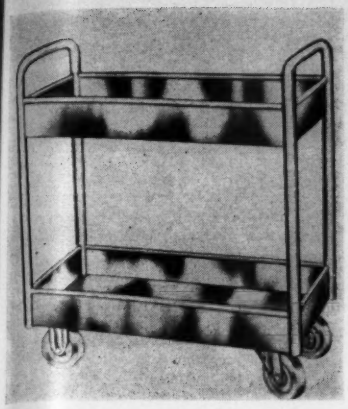
Trucks, hand

THE use of light-weight materials still prevails in the manufacture of the indispensable hand truck. A four-wheel unit introduced enables an operator to roll heavy appliances on the horizontal rather than balancing them vertically.

Yeats Appliance Dolly Sales Co.
Aluminum alloy frame, caterpillar step glide and strap ratchet are features of half-ton capacity dolly
Circle 175 on Service Card, Page 33

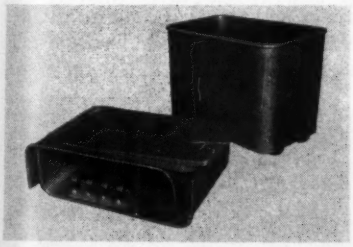


Magline, Inc.
New hand truck addition is rated to handle loads up to 450 lb. Weighs 16 to 20 lb based on type of wheel used
Circle 176 on Service Card, Page 33



Precision Equipment Co.
Heavy duty stock-handling cart for moving parts or material. Five-inch swivel and stationary wheels
Circle 177 on Service Card, Page 33

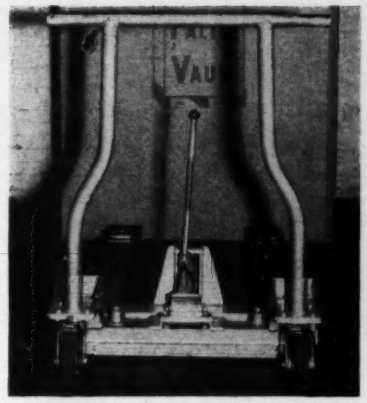
Colson Corp.
Folding rack is claimed to increase carrying capacity of hand trucks. Can be installed on existing trucks
Circle 178 on Service Card, Page 33



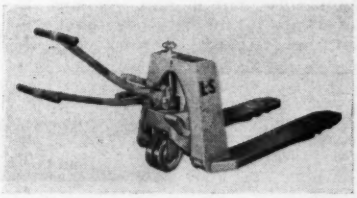
Kennett Equipment & Machinery Co.
Units feature angle base frames, channel caster supports, roller bearing steel casters. Ease of assembly
Circle 179 on Service Card, Page 33

Trucks, pallet

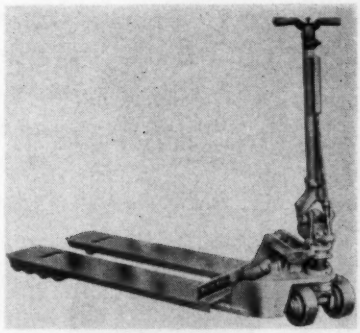
A NEW pallet truck that will accommodate virtually any pallet size or type has been presented. A new addition to the line raises the truck frame to provide clearance over uneven floors or sharply rising ramps. Features of new units include greater operational range and increased capacities.



General Van & Storage Co.
Six load-carrying wheels. Tandem rear wheels prevent stalling. Lowered fork height 3¼ in., lift: 5½ in.
Circle 180 on Service Card, Page 33



Lewis-Shepard Products, Inc.
Pallet truck for use on grades offers safety brake which operates on front wheels of truck, not on the floor
Circle 181 on Service Card, Page 33

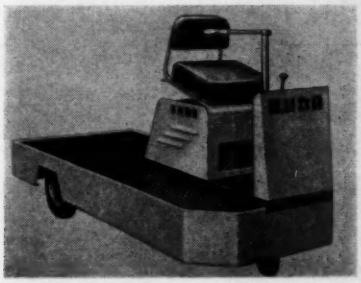


West Bend Equipment Co.
2,500-lb capacity pallet truck handles most any type pallet. All-welded unit has 270-deg lift handle
Circle 182 on Service Card, Page 33

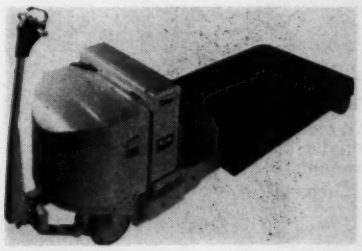
Trucks, platform

THE new versatile walkie and rider type platform trucks can perform in low clearance and narrow aisle operations, as well as handle many distribution tasks. A new type unit is equipped with a time-delay switch that prevents jerking the load starting in high.

Wright-Hibbard Truck Co.
Hydraulically operated platform, ball and socket steering, magnetic controller, 4 running speeds feature unit
Circle 183 on Service Card, Page 33



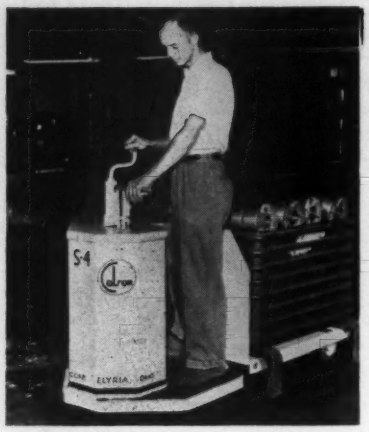
The Buda Co.
Features of 2,000-lb capacity unit include quick change clutch, shorter turning radius, self-adjusting brakes
Circle 184 on Service Card, Page 33



Lift Trucks, Inc.
Hand motorized lift truck handles heavy machinery over a floor of limited capacity. Four driving wheels
Circle 185 on Service Card, Page 33

. . . Equipment Round-Up

(Continued from Preceding Page)



Colson Corp.
4,000-lb hydraulic lift has single control lever for throttle, power lift and direction. Automatic shift
Circle 186 on Service Card, Page 33

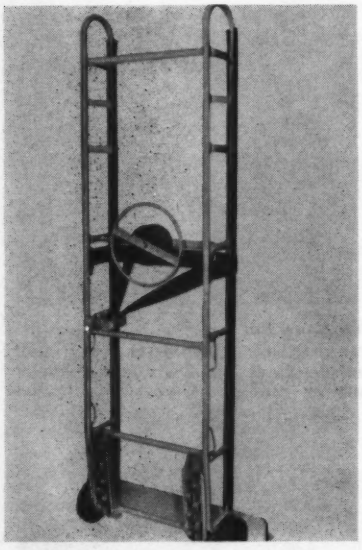
gers and loads, and claimed to travel up to 40 miles without recharging, as well as a new 20,000-lb capacity straddle truck having greater lifting capacity, are new additions to the line.

Cushman Motor Works, Inc.
Electrically driven unit claimed to travel up to 40 miles without recharging. Ground clearance 4½ in.
Circle 188 on Service Card, Page 33

William Bal Corp.
Increased structural strength with a low weight factor has been claimed for stock handling shelf truck unit
Circle 189 on Service Card, Page 33

Kwik-Mix Co.
Combination hopper or flatbed platform unit claims 50 per cent hopper capacity increase, 4-wheel balance
Cirlce 190 on Service Card, Page 33

Trucks, special

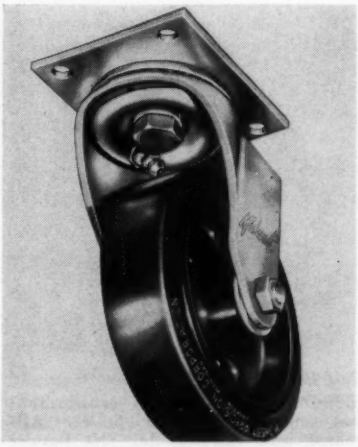


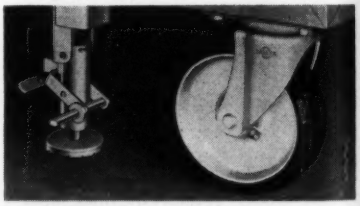
The Fairbanks Co.
All-steel Stairmaster appliance truck weighs 35 lb. No rubbing, rolling or friction between climber and step
Circle 187 on Service Card, Page 33

A NEW truck unit, available as a hopper or flatbed platform unit, has been presented. An electric unit for transporting passen-

Wheels & Casters

SEVERAL new type wheels and casters have been introduced to meet materials handling requirements. Swivel and rigid casters, designed for greater load capacities, are available in a wide choice of soft and hard tread wheels.





The Bassick Co.
A new retractable position lock for castered trucks is claimed to allow 200 per cent more ground clearance
Circle 191 on Service Card, Page 33

Midwest Precision Corp. (Left)
Heat-treated cadmium plates, larger ball bearings, and ⅝-in. king pin are features of this new caster unit
Circle 192 on Service Card, Page 33

(To be Continued in June Issue)

Materials Handling Primer

By D. O. Haynes
DA Materials Handling Consultant

Portraying graphically the basic principles, commercial types and practical applications of materials handling equipment employed in physical distribution

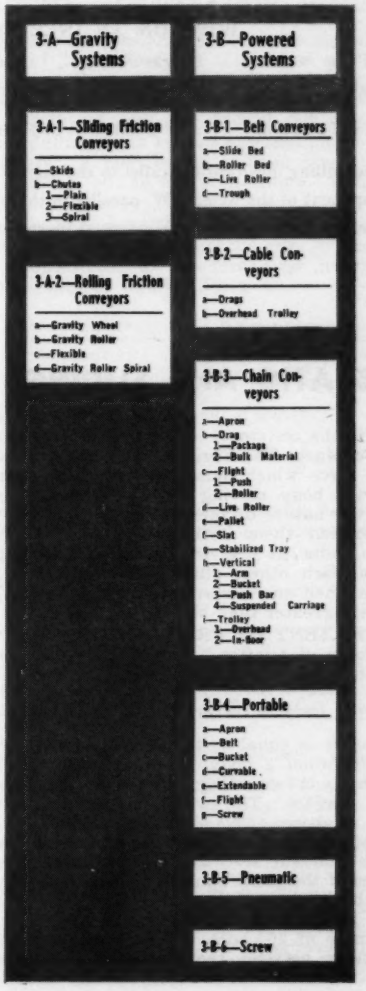
Consider the simplest of man's tools—the lever, the wheel and the inclined plane. Now, combine these in such ways that they make available, for the purposes of lowering materials, the force of gravity and centrifugal force and you have all the basic elements required for creating gravity conveyors.

A countless variety of contrivances have sprung from these humble origins. Skids, plain and spiral chutes, together with wheel and roller conveyors, are among our most economical and widely used kinds of materials handling equipment.

Because of their relative simplicity—they require no power to operate them—sliding and rolling friction gravity conveyors have been selected as the subjects for the first articles of this graphic series.

All principal types of Gravity Systems are covered in this issue. The next article, which will appear in the June issue, will be devoted to Package Belt Conveyors. This will be the first of several covering Powered Conveying Systems. Subsequent articles, in the following issues, will complete that series.

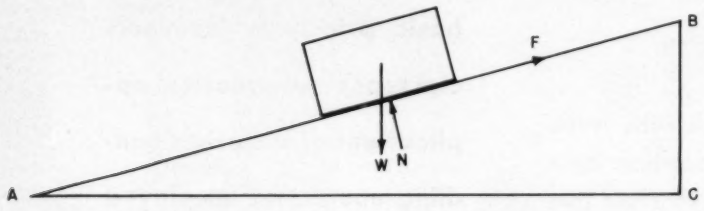
The pattern adopted in the presentation of the series is that outlined in the DA Master Chart of Basic Materials Handling Systems, published in the May, 1954, issue of DISTRIBUTION AGE. For reader convenience, a portion of that chart—that dealing with conveying systems—is reproduced at right. Ultimately, all five sections—as they apply to Distribution—will be covered.

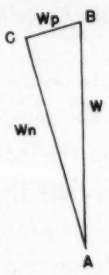


EDITOR'S NOTE: This series of copyrighted articles is being excerpted from a forthcoming book by the author. The editors of DISTRIBUTION AGE gratefully acknowledge the privilege of exclusive prepublication magazine rights.

3-A. Gravity Conveyors

3-A-1. THE MECHANICS OF INCLINED SLIDING FRICTION





BODY ON AN INCLINED PLANE

Length of Plane = AB Height = BC Horizontal Distance = AC

W = Weight of Body N = Normal (Perpendicular) Pressure

F = Force of Friction f = Coefficient of Friction = $\frac{F}{N}$ (1)

P = Force pulling downward parallel to the plane's surface

W_p = Component of the weight, W, parallel to the plane's surface

W_n = Component of the weight, W, normal (perpendicular) to the plane's surface

COMPONENTS OF W

$\frac{\text{Height of Plane}}{\text{Length of Plane}} = \frac{BC}{AB} = \sin A$

$\frac{\text{Horizontal Dist.}}{\text{Length of Plane}} = \frac{AC}{AB} = \cos A$

$\frac{\text{Height of Plane}}{\text{Horizontal Dist.}} = \frac{BC}{AC} = \tan A$

$W_p = W \sin A$ (2) $W_n = W \cos A$ (3)

STATIC AND SLIDING FRICTION ON AN INCLINED PLANE

FRICTION is the resistance offered to the motion of two surfaces in contact. **The Force of Friction** (F) is a measure of the force which must be overcome against friction to start a body moving and to keep it moving. It varies with the nature of the contacting surfaces and the pressure between them. **Static** friction is the friction between two bodies at rest or about to start moving with reference to each other, **sliding** friction, that between two surfaces when one is moving over the other. The former is slightly greater than the latter.

THE COEFFICIENT OF FRICTION (f) is the ratio between the force of friction (F) and the pressure normal (perpendicular) to the contacting surfaces, (N), ie., $f = \frac{F}{N}$. When a body is resting on an horizontal plane, the normal pressure is equal to the weight of the body, N = W. However, when a body is on an inclined plane, its entire weight is not exerting a pressure perpendicular to the plane's surface. The weight is resolved into two components, as shown above. The component W_p is parallel to the contacting surface, while the other component, W_n, is normal to that surface. The values of the components are functions of the plane's angle of inclination and of the weight of the body as indicated in the equations above.

Example: A 100-lb body is resting on a plane which makes an angle of 10° with the horizontal. What is the normal pressure between the body and the plane?

$N = W_n = W \cos 10° = 100 \times 0.98481 = 98.5$ lbs

If the force of friction (F) is 10 lbs, what is the coefficient of friction?

$$f = \frac{F}{N} = \frac{10}{98.5} = 0.1015 \text{ or } 0.1$$

SOME STATIC COEFFICENTS OF FRICTION

The following are the starting (static) coefficients of friction (f) between some materials often encountered in chute operations:

	Static Coefficient of Friction (f)
Metal on metal	0.15 to 0.25
Wood on metal	0.2 to 0.6
Wood on wood	0.25 to 0.5

The coefficient of sliding friction is lower than that of static friction. The coefficients of friction are unique for two given materials and are always the same provided the accompanying conditions, such as the atmosphere, remain unchanged.

NATURAL TRIGONOMETRIC FUNCTIONS

Angle	10°	20°	30°	40°
Sine	0.17365	0.34202	0.50000	0.64279
Cosine	0.98481	0.93969	0.86603	0.76604
Tangent	0.17633	0.36397	0.57735	0.83910

Gravity conveyor data in this section include information of devices for lowering materials down fixed declined routes by the force of gravity acting against sliding or rolling friction. There are two types, Sliding Friction Conveyors, and Rolling Friction Conveyors.

The Sliding Friction Conveyors include skids and chutes. Included in the Rolling Friction Type are wheel conveyors, roller conveyors, flexible gravity conveyors and roller spiral conveyors.

BODY ABOUT TO SLIDE DOWN A PLANE

As the angle of a plane on which a body is resting is increased, and when it attains a certain size, called the angle of repose, the component of the weight parallel to the plane's surface (W_p) is just sufficient to overcome the opposing force of friction (F). Sliding is about to start. The following equations express the relationships at this point:

$$\text{Angle of Repose} = A_r$$

$$W_{rp} = W \sin A_r = F$$

$$W_{rn} = W \cos A_r = N$$

$$f = \frac{F}{N} = \frac{W \sin A_r}{W \cos A_r} = \tan A_r$$

NOW THE BODY IS SLIDING

It requires a slightly greater angle than the angle of repose to keep a body sliding down a plane. Or, to put it another way, the component of the weight down the plane must be greater than the force of friction. Here are the equations:

The net value of the downward force = P_s.

$$P_s = W_{ps} - F = W \sin A_s - f\,W \cos A_s$$

$$= W (\sin A_s - f \cos A_s)$$

Let us now take this fundamental equation and by varying the elements, see what the results turn out to be.

Variations in the weight of the body, W. It is evident by inspection that if W is doubled, the value of the net pull down the plane, Ps, is also doubled. Therefore, we can conclude that any variation in the weight of the body results in a similar change in the value of the pull downward parallel with the plane.

Let us assume a 30-lb body resting on an inclined plane. The coefficient of friction is 0.2. What will be the net downward pull parallel to the plane's surface when the angle of inclination of the plane is 20°? 30°? 40°?

20° $P_s = 30\ (0.34202 - 0.2 \times 0.93969) = 4.6$ lbs

30° $P_s = 30\ (0.50000 - 0.2 \times 0.86603) = 9.8$ lbs

40° $P_s = 30\ (0.64279 - 0.2 \times 0.76604) = 14.7$ lbs

Let us now assume that this same 30-lb body is on a plane elevated to 20°. What will the net downward pull along the plane's surface be when the coefficient of friction (f) is 0.1? 0.2? 0.3?

0.1 $P_s = 30\ (0.34202 - 0.1 \times 0.93969) = 7.4$ lbs

0.2 $P_s = 30\ (0.34202 - 0.2 \times 0.93969) = 4.6$ lbs

0.3 $P_s = 30\ (0.34202 - 0.3 \times 0.93969) = 1.8$ lbs

DEDUCTIONS FROM ABOVE EXAMPLES

The laws of sliding friction are not well established. There are many unpredictable factors which can so alter conditions that theories do not always hold. However, the above examples give one a "feeling" of how bodies act when they are sliding on inclined planes. The following deductions are borne out by everyday practice.

It has been shown that, if all other factors remain unchanged, the downward pull parallel with the plane varies directly with the weight of the sliding body. So also, the normal pressure.

An increase in the angle of inclination, as would be expected, increases the net downward pull along the plane's surface. The figures developed indicate that, within the limits between 20° and 40°, the force increases approximately 5 lbs for each 10° increase in the angle, or ½ lb per degree.

Increasing the coefficient of friction is an obvious means of reducing the downward pull on the body. The figures shown that between the values of 0.1 and 0.3 for f, the decrease is about 2.8 lbs for each tenth change in f. It must be remembered, however, that this change is only when the angle of elevation is 20°. What about the situation when the angle is 30°? The figures are 12.4, 9.8 and 7.2 lbs respectively. The change now is a bit lower—2.6 lbs for each change in f.

This discussion brings out the several factors which affect the sliding of bodies on inclined planes. The practical aspects are shown graphically on the following page.

VELOCITY, ACCELERATION, MOMENTUM

The velocity of a moving body is the distance it covers in a unit of time—feet per minute or per second. Its acceleration is the rate at which its velocity is changing per unit of time—feet per minute per minute, usually written ft/min² or feet per second per second—ft/sec².

A freely falling body has an acceleration due to gravity of 32.2 ft/sec². A body on an inclined plane is also actuated by gravity, but is not free-falling. What is its acceleration?

When a body is actuated by a force, it is accelerated in the direction of the force and the rate of acceleration is directly proportional to the force and inversely proportional to its mass or weight. Thus

$$\frac{\text{Value of the Force}}{\text{Acceleration}} = \frac{\text{Weight of the Body}}{\text{Acceleration of Gravity}}$$

F = force a = acceleration W = weight of the body

g = acceleration due to the pull of gravity.

$$\frac{F}{a} = \frac{W}{g} \quad \text{or} \quad a = \frac{Fg}{W}$$

The force F is the net downward pull parallel with the plane's surface, so we can substitute its value, P_s, in the equation, which then becomes:

$$a = \frac{P_s g}{W} = \frac{W (\sin A_s - f \times \cos A_s) \times g}{W}$$

$$= 32.2 (\sin A_s - f \times \cos A_s)$$

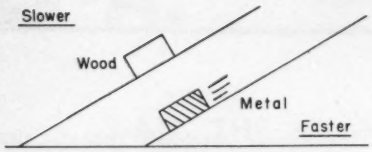
Example: A body is sliding down a plane whose angle of inclination is 20°. The coefficient of friction is 0.2. What is its acceleration?

$$a = 32.2\ (0.34202 - 0.2 \times 0.93969) = 5 \text{ ft/sec}^2$$

This demonstrates how drastically the inclined plane modifies the acceleration of a body. This is one of its most valuable characteristics. It should be noted that all the factors, except the weight of the body, which affect the value of P_s similarly affect the rate of acceleration.

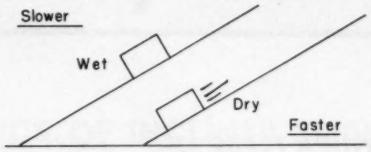
Momentum is the quantity of motion in a moving body and is proportional to the mass of the body, multiplied by its acceleration. Momentum is an important factor in chute operations. Because of the momentum of heavy objects it is necessary to check their acceleration in order to avoid damaging impacts.

SLIDING ACTION ON SKIDS AND PLAIN CHUTES



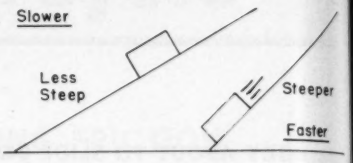
CONTACTING SURFACES

Nature of surfaces in contact determine the rate of descent. Metal on metal is faster than wood on metal or wood on wood.



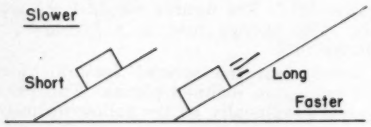
ATMOSPHERIC CONDITIONS AND MOISTURE

Affect the rate of descent. Dry cartons and cases slide more easily and rapidly than wet or damp containers.



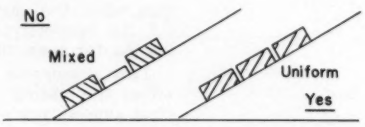
PITCH OF THE SKID OR CHUTE

The greater the pitch (angle of elevation) the greater the acceleration and momentum of the sliding object. Pitch should be as low as practical.



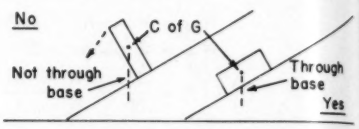
LENGTH OF THE SKID OR CHUTE

The longer the slide, the greater the acceleration. Straight chutes should be kept as short as possible to avoid excess speeds.



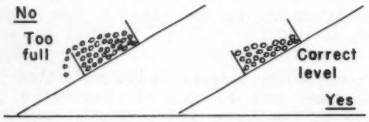
MOMENTUM OF ARTICLES

Heavy articles gain more momentum over same path of descent than do light ones. Avoid damage to latter by not mixing weights.



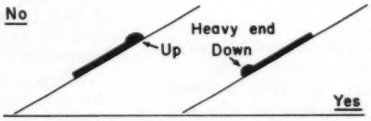
CENTER OF GRAVITY

The vertical line through object's center of gravity must pass through the contacting surface, otherwise the object will fall forward.



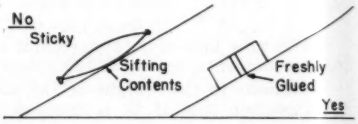
OPEN CONTAINERS

Level of contents, if liquid or loose, solids must be such that there will be no spillage when the container tips down a chute.



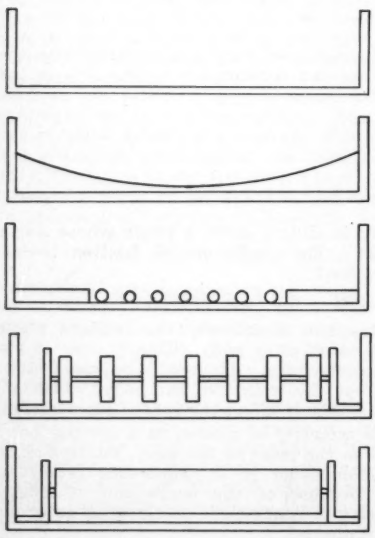
LONG, UNBALANCED OBJECTS

such as bundles of brooms and garden tools should be fed onto a chute with the heavy ends down to give best ride.



STICKY OR GUMMY MATERIALS

Chutes are not recommended for lowering bags which contain sticky materials which may sift, nor for freshly sealed cartons.



FLAT BED is most widely used. Adaptable to majority of products. Guardrails are optional.

CONCAVE BED is used for free-flowing materials, sacks, etc. Tendency is to ride in center.

PIPE SLIDE for sacks, barrels, etc. With this arrangement barrels can ride on their sides.

ROLLER OR WHEEL BED. The principles underlying this type will be discussed in later chapters.

MATERIALS used include steel, stainless steel, aluminum, magnesium, wood and special surfaces.

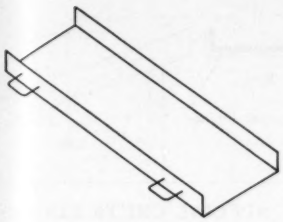
EXAMPLES OF CHUTE BEDS

The illustrations show some of the many types of chute beds which add diversity to the application of chutes in handling materials.

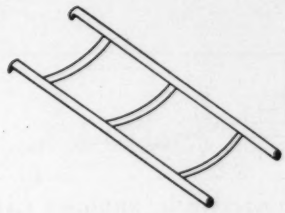
These examples are given as suggestions to the prospective user of chutes. No attempt is made to go into the technical aspects of chute construction. Manufacturers of this type of equipment have qualified engineers whose advice should be sought and used in solving a given chute problem.

There are technical problems in connection with spirals which have either wheel or roller beds. These are not discussed here with the strictly sliding friction types, but will be found where gravity wheel and roller conveyors are covered.

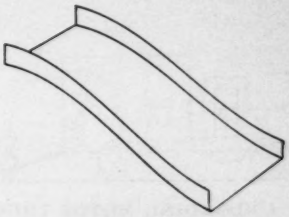
EXAMPLES OF COMMERCIAL SKIDS AND CHUTES



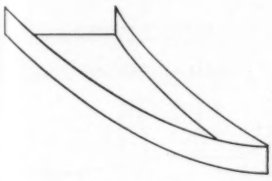
STRAIGHT SKID
The simplest of all gravity conveyors.



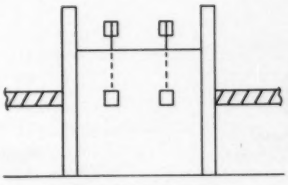
BARREL SKID
Used with both barrels and drums



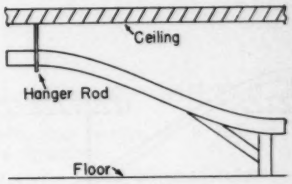
VARIED PITCH CHUTE
Reduces final speed of articles



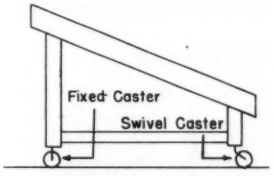
CURVED CHUTE
Often used to clear columns



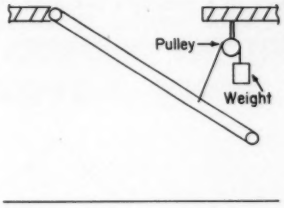
FIRE DOORS
Required by many localities



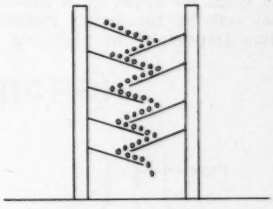
SUPPORTS
Ceiling and floor types shown



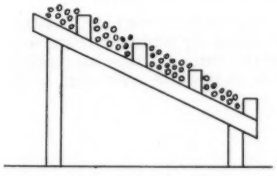
PORTABLE
With any wheel-caster combination



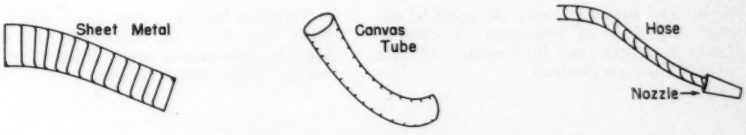
HINGED OVERHEAD
Easy way to store a chute overhead



LADDER CHUTES
Control descent of bulk materials



ANGLE CLEAT

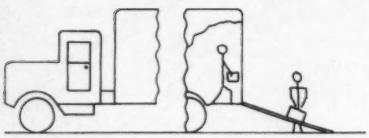


TYPES OF FLEXIBLE CHUTES
Several materials, metal, canvas, etc., available.

THE VERSATILITY OF SKIDS AND CHUTES

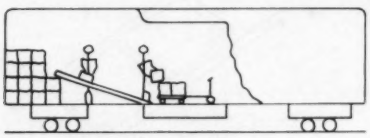
As a group, skids and chutes are the most economical means available for lowering materials and articles. The force of gravity is, of course, free and the equipment which utilizes it as the moving force is itself relatively inexpensive. Furthermore, skids and chutes, if given a reasonable amount of care, require practically no maintenance expense. It may be that a running surface might have to be repaired or replaced, but this can usually be done by the user's own maintenance personnel. Such moving parts as there are—wheels and casters on portable models, pullies and hinges, etc.—are extremely simple. It is surprising, however, how many different variations are possible.

TYPICAL APPLICATIONS OF SKIDS AND CHUTES



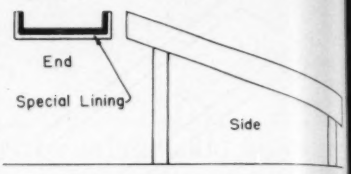
UNLOADING MOTOR TRUCK

Barrel skids and portable chutes are used extensively for this purpose by warehousemen, grocers, truckmen, delivery men, etc. An old tire can serve as a bumper.



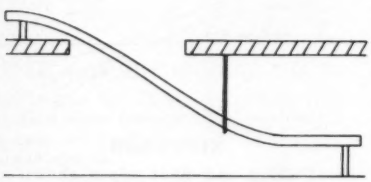
UNLOADING FREIGHT CARS

Frequently used to breakdown tiers of merchandise stowed in freight cars, especially bagged goods and barrels. Drums are also sometimes handled in this manner.



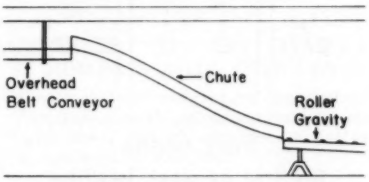
SPECIAL CHUTE LININGS

Linings of various constructions make possible the use of chutes to convey damp or wet textiles as well as abrasives, acids and corrosives without damage to the chutes or products.



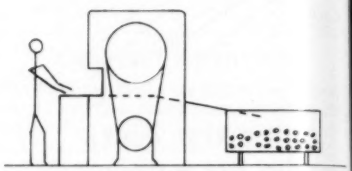
FLOOR-TO-FLOOR CHUTES

Most economical way to move products from an upper to a lower floor. Must not be too long. Positions of beams important in planning setup.



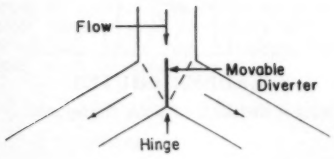
PART OF HANDLING SYSTEM

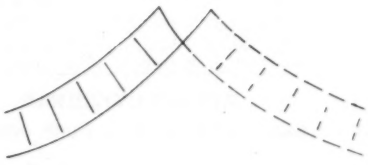
Chutes are frequently used as elements in a complete handling system to provide lowering by inexpensive rather than costlier equipment.

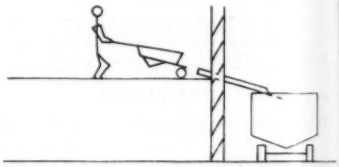


HANDLING WORK-IN-PROCESS

Short sections of chutes are used to lead small parts from such production machines as punch presses and automatic screw machines into shop boxes.







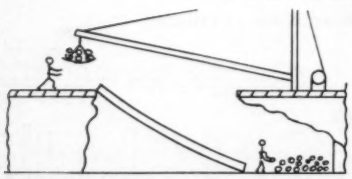
SELECTIVE DISCHARGE

A hinged diverter may be used to direct the flow of material or objects from a single line into either of two other lines as desired.

Flexible chutes are also used to shift the flow of materials in ship loading operations although not necessarily restricted to ships.

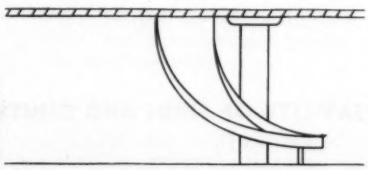
DISPOSAL OF ASH AND SCRAP

An economical way to deposit ashes and scrap by chuting from a building directly into a truck or railroad car. Other materials also can be handled.



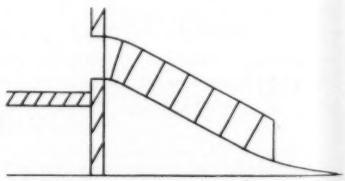
BAGS INTO SHIP'S HOLD

Flexible canvas tube chutes are utilized to feed bags into ships' holds. They can be directed to the exact part of the hold where the bags are to be stowed.



AROUND COLUMNS

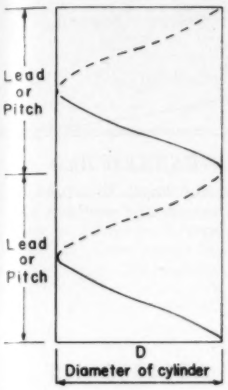
Curved chutes are convenient means of directing flow of materials between floors where columns are so placed that it would be impractical to use straight chutes.



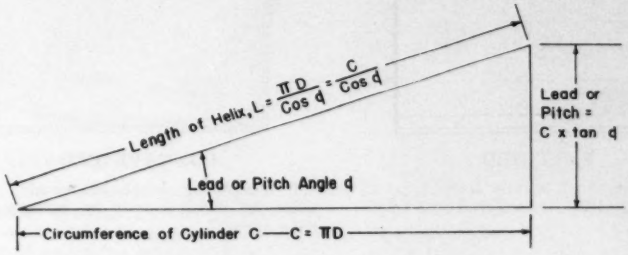
FIRE ESCAPES

Large plane or tubular shaped chutes are employed as fire escapes. They are widely used in schools and institutions and in low industrial and office buildings.

THE BLADES OF SPIRAL CHUTES FOLLOW A HELIX



HELIX ON CYLINDER



DEVELOPED (UNROLLED) HELIX

DEFINITIONS

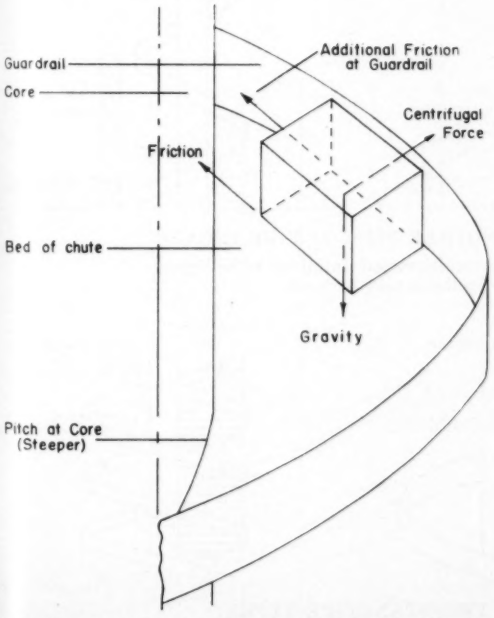
HELIX: The curve traced on a right circular cylinder by a point as it advances uniformly around the cylinder.

PITCH: The vertical distance (lead), between two points on a helix when the curve has advanced once around the cylinder.

PITCH ANGLE: The angle between the helix and a plane perpendicular to the longitudinal axis of the cylinder.

LENGTH OF HELIX: The length of the path of the helix as it advances through one complete turn around the cylinder.

THEY COMBINE THE USE OF GRAVITY, CENTRIFUGAL FORCE, AND FRICTION



THE CONTROLLING FORCES WHICH AFFECT THE ACTION OF PACKAGES ON SPIRAL CHUTES

Additional friction at guardrail slows down the heavier packages as they are forced out toward it by centrifugal force.

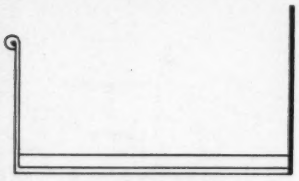
ACTION OF PACKAGES ON SPIRAL CHUTES

Individual packages tend to find their own best paths of descent on spiral chutes.

Lighter packages ride closer to the center because the centrifugal force exerted on them is not as great as on heavier packages. However, the pitch of the spiral is steeper near the center so these packages speed up. Then the centrifugal force increases and drives them out toward the central portion of the runway where the pitch is gentler. There they are automatically slowed up.

Heavier packages are forced out toward the guard rail and when they contact it, the added friction between them and the rail slows them down.

TYPICAL SPIRAL CHUTE BEDS, CONSTRUCTION AND ACCESSORIES

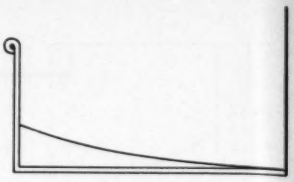


FLAT BED

This is the most widely used type of bed. It handles the majority of products well.

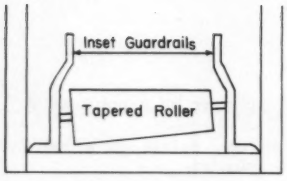
CONCAVE BED

For centering loose materials. The edges of cartons may be damaged by this type.



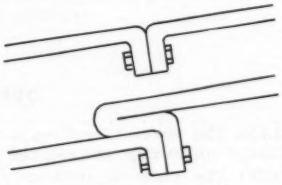
BANKED BED

Excellent for bags, but here, too, the ride on the concave surface may damage cartons.



ROLLER BED

Often indicated for giving drums a smooth, easy ride on their ends.



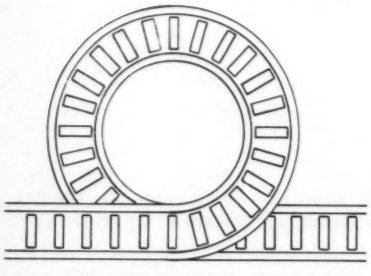
CONSTRUCTION

There are also special sanitary constructions for handling meats and other food products.

ACCESSORIES

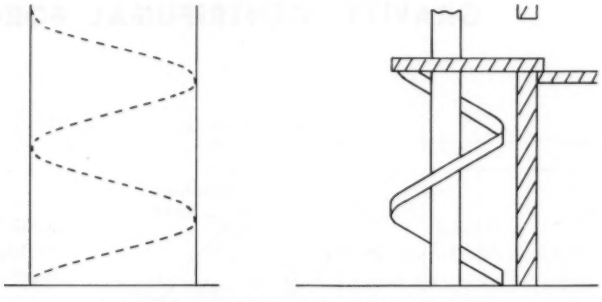
In additions to variations in construction and the heights of guardrails, there are many ingenious accessories which add to the flexibility of spiral chutes. These include inlet and exit slides, loading gates, etc., to assist in feeding and discharging. Examples are illustrated on the following page.

TYPICAL SPIRAL CHUTES



ROLLER SPIRAL TYPE

provides easy descent for drums on end, fragile loads, etc.

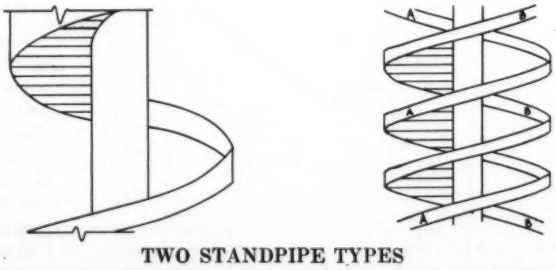


ANOTHER TYPE OF FIRE ESCAPE

For multistoried buildings either open or enclosed may be used.

OPEN CORE TYPE

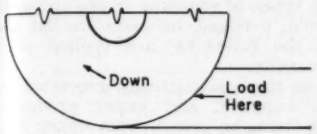
Single blade, left hand, open core. Can also be right hand.

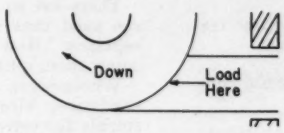


TWO STANDPIPE TYPES

The first is a single blade, right hand chute running around a standpipe. The second is a double blade type, often used for selectivity.

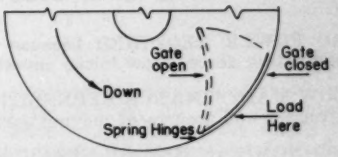
TYPICAL INLET SLIDES AND LOADING GATES





INLET SLIDES HELP IN LOADING CHUTES

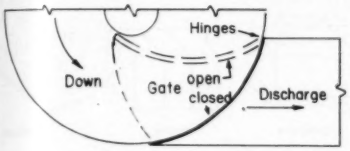
Used at top and intermediate floors to permit sliding articles onto chutes. On intermediate floors slide are fixed, or if necessary to clear them from the runway, may be hinged. Frequently used in connection with loading gates. High, cubical or light packages best loaded over side of guardrail because of drop off slide onto chute. Infeeding is in direction of downward flow, as shown in sketches.



LOADING GATES IN GUARDRAIL

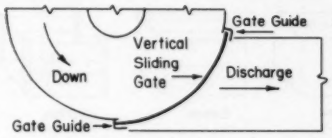
Used without a slide inlet where runway pitches are shallow and for heavy articles; with a slide where pitches are steep or articles light, high or cubical shaped. When closed, gate acts as part of rail.

DIVERTERS FOR DISCHARGING FROM SPIRAL CHUTES



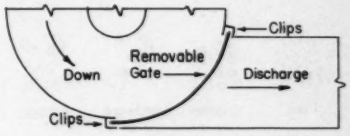
HINGED GATE TYPE

Used on open, single blade chutes. Operated manually by pull handle connected to gate through cord and pullies. Remote control of discharge possible, even from another floor. Dotted gate shows position during discharging.



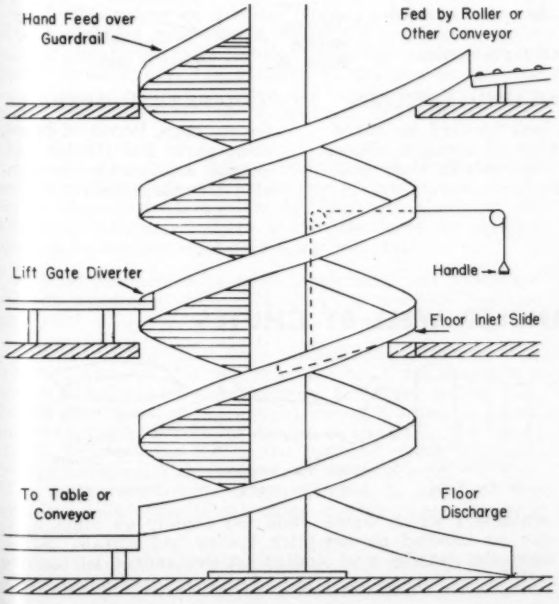
VERTICAL SLIDING GATE TYPE

Used on double- and triple-blade and enclosed spirals. Can act as fire door if properly constructed. Also used on open spirals. When closed, gate is part of guardrail. Slides upward in fixed guides to permit discharge.



REMOVABLE GATE TYPE

Although simplest type, it is not always practical because of the weight of the gate, especially with high guardrails used on wide runways. When used with banked runway, a quarter-round of flat bed is inserted to prepare for discharge.



SELECTION AND TYPICAL INSTALLATIONS

A spiral chute is almost invariably engineered for a particular situation. Width of runway, pitch, clearance and height of guardrail must be fitted to the nature of the contacting surfaces, dimensions of articles, their shapes and weights, as well as such operating conditions as presence of moisture or humidity. Adequate clearance is always important, but especially so where multiple blades, fire doors, inlet slides, etc., are used.

The accompanying sketch shows how some of the various inlet slides, loading gates, etc., are used. When curved conveyors or chutes are employed to feed articles onto a spiral chute, they should have the same right or left hand thread as the spiral, and should have pitches as gentle as possible. Fire doors (not shown) must be installed where required by local ordinances or underwriter's regulations. The double-blade permits using a spiral chute for articles of different characteristics or for selective discharge—often desirable features.

ADVANTAGES OF SPIRAL CHUTES

NO POWER REQUIRED because gravity supplies the motivating force. Low initial investment required.

LOW MAINTENANCE EXPENSE because of simple construction and absence of moving parts.

ECONOMICAL USE OF SPACE inherent in the spiral principle of construction compared with other types of conveying equipment.

SPEED OF DESCENT CONTROLLED far more satisfactorily than with straight or curved chutes.

GOOD SELECTIVITY POSSIBLE through use of double- or triple-blade construction by assigning one blade to a specific kind of material.

TYPES OF INDUSTRIES WHERE SPIRALS ARE USED

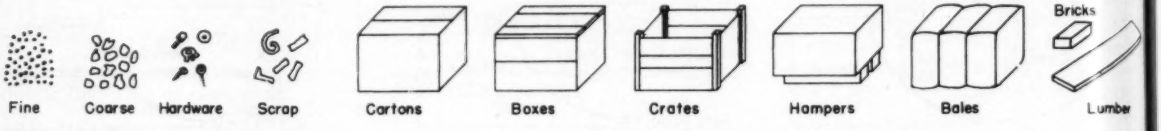
There are so many types of concerns where spiral chutes are used that it would, perhaps, be easier to list the exceptions. However, the following are typical of those using them quite generally.

Wholesalers such as those distributing groceries, drugs, hardware, electrical supplies, and paper products use spirals for conveying items on orders from upper floors to the shipping department or platform on a lower level.

Manufacturers of shoes, textile products, furniture and a host of others use chutes for movement of materials between operations on different floors and to packing and shipping departments.

Also widely used in meat processing plants, oil refineries, laundries, power plants—in fact, almost any type of establishment where economical conveying is required, and the products lend themselves to spirals.

TYPES OF ARTICLES HANDLED WELL BY CHUTES

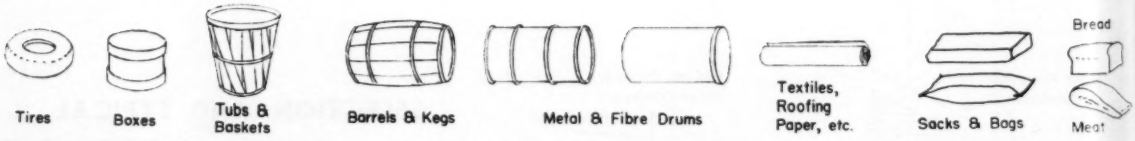


FREE-FLOWING MATERIALS

Finely divided and coarse materials —flour, grain, ashes, fruits, vegetables and nuts; hardware, such as bolts and nuts. Also non-viscuous liquids.

RECTANGULAR SHAPED ARTICLES

Requirements: Dry contacting surfaces which are not damaged by sliding. Roller beds eliminate damage due to sliding friction and permit easier, slower descent. Packages which might be damaged by sliding contact, those with fragile contents or contents which might spill at steep pitch ride well on rollers.



CIRCULAR SHAPED ARTICLES

Boxes (cheese), tubs (butter), tires, coils or rope or wire, etc., provided there is good sliding surface and center of gravity is low.

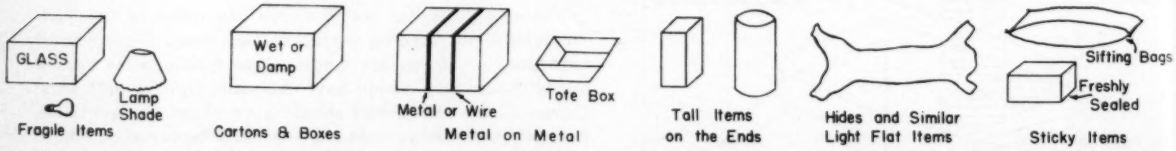
CYLINDRICAL SHAPED ARTICLES

Some of these are best handled by barrel skids or pipe bed type of straight chute. Barrels and drums ride well on their ends over roller bed spirals.

ODD-SHAPED ARTICLES

Sacks, bags, loaves of bread, meat parts and similar odd-shaped articles can be handled advantageously.

TYPES OF ARTICLES NOT HANDLED WELL BY CHUTES



Fragile items can best be conveyed without damage by types of conveyors other than chutes. Damp or wet boxes and carton hang up on slide beds. However, some metal containers which would slide too rapidly on slide beds, can be handled on low-pitch trailer bed spirals. Skins, light flat textiles and similar articles cannot be handled well by chutes.

3-A-2. Rolling Friction Gravity Conveyors

THE MECHANICS OF ROLLING FRICTION CONVEYORS

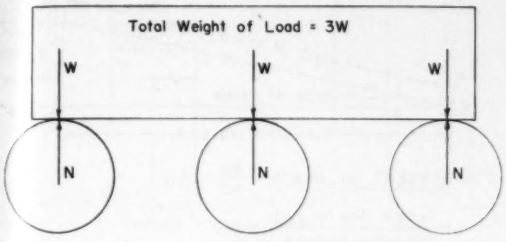


FIGURE A

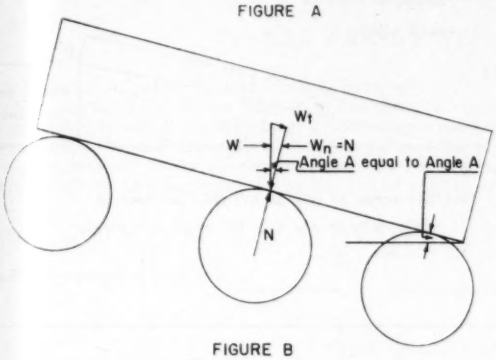


FIGURE B

ROLLING FRICTION is utilized in conveyor construction to eliminate the damage which may result from sliding on friction gravity chutes and to permit use of lower angles of incline than are possible with the plainer types. It is the force required to overcome the resistance to rolling motion. It is caused by irregularities in the form and the surface roughness of bodies rolling in contact with each other.

An article riding on a roller friction conveyor is like a vehicle equipped with wheels, except that in this case, the wheels remain in fixed positions and the package itself moves forward over the surfaces of the wheels. Rolling contact is maintained between the article and the wheels rather than between the wheels and the surface of a runway.

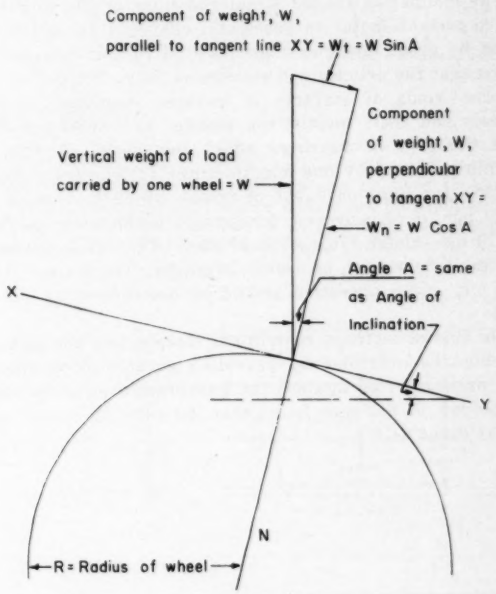
Factors other than rolling friction between the article and the conveyor affect the operation of these types of conveyor. There is friction in the bearings which support the wheels or rollers and there is the inertia of the moving parts to be overcome before rolling will start.

Why do products with suitable surfaces roll downward without assistance when placed on a properly inclined conveyor?

A body resting on a level rolling friction conveyor is shown in Fig. A. The weight of the body, for example, a box, is distributed evenly between the three rolling elements. The force of the weight on each wheel is transmitted through the point of contact to the axle. The forces are in equilibrium—the thrust upward from the axle exactly counteracts the weight on the wheel's rim. Weight W = the normal (perpendicular) force, N, and they are opposing each other in the same straight line. There is no motion.

When the conveyor is inclined so that the line tangent to the surfaces of the wheels makes an angle A with the horizontal, a different situation is developed, as shown in Fig. B. The weight of the box, W, still acts vertically, but its point of application on the rims of the wheels is changed. In Fig. C the weight, W, is resolved into two components—W_t, in a direction parallel with the tangent line and W_n, normal to the tangent line. W does not cause any motion. W_t, on the other hand, acts at the end of the radius R at the point of contact with the wheel and causes the latter to rotate, provided the moment $W_t \times R$ is sufficient to overcome the rolling friction between the box and the wheel, the friction in the bearings and the inertia of the wheel and other moving parts.

The same mechanical principles apply to both wheel and roller conveyors. The inertia of the latter type is greater than that of the former, but this difference is frequently overcome by using more efficient bearings. Further, the greater number of wheels required frequently overbalances the inertia of fewer rollers, so that in most instances the pitch required to permit free rolling is only slightly greater with roller than with wheel conveyors.



Turning Moment = W_t x R

FIGURE C

W = Vertical weight of box carried by wheel
W_t = Component of W parallel to tangent line
W_n = Component of W perpendicular to tangent = N
W_t = W sin A W_n = W cos A = N
$W_t \times R$ = Turning moment about axle.

Note: Angle A is exaggerated in above to produce a clearer drawing in a restricted space.

IMPORTANCE OF INCLINE IN WHEEL CONVEYOR OPERATIONS

THREE WAYS TO EXPRESS THE INCLINE OF A CONVEYOR

The inclination of a conveyor can be expressed in three ways:

1—**The Angle of Incline,** the angle a line tangent to the rolling surfaces makes with the horizontal. Not a convenient unit for practical use. See Fig. D.

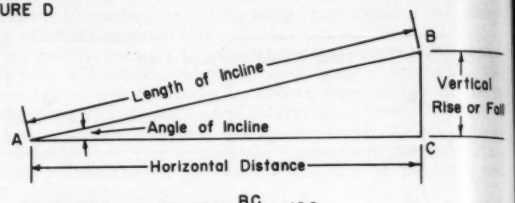
2—**The Per Cent of Grade,** the vertical rise (or fall) divided by the corresponding horizontal distance, and the result multiplied by 100. It is the rise in feet per 100 feet of horizontal distance stated as percentage. Both elements must be measured in the same linear unit—inches or feet. Triogonometrically, the percent of grade is the tangent of the angle of incline multiplied by 100. See Fig. D.

3—**The Rise (or Fall) in Inches per Foot of Conveyor Length.** Sometimes stated as the inches of rise or fall in a 5-ft or a 10-ft length of conveyor. Very useful in planning a conveyor setup. See Fig. E and Table.

The inclination (called either the slope or the pitch) is an important factor in successful conveyor operation. It must be great enough to permit free rolling, but not so great that the articles will ride too rapidly. Weight of the article, kinds of surfaces in contact, diameters of the wheels and their inertia, the number of wheels per foot and the type of bearings affect the speed. A rule of thumb proposed by one manufacturer of wheel conveyors is that for light packages or boxes—10-30 lbs—about 4″ to 5″ per 10′ of conveyor; for heavier packages or boxes—30-70 lbs—about 3″ or 4″ in 10 feet. The values given in the table below are, of course, averages. The correct slope for any given operation should be determined by actual test.

On curved sections, centrifugal force enters the picture. It must be overcome by providing greater slope and, if the packages ride against the guardrail, even more slope is needed. It has been found that the slope on curves may be as great as 3″.

FIGURE D

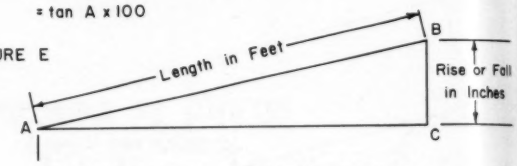


$$\text{PERCENT OF GRADE} = \frac{BC}{AC} \times 100$$

$$= \frac{\text{Vertical Rise (or Fall)}}{\text{Horizontal Distance}} \times 100$$

$$= \tan A \times 100$$

FIGURE E



PITCH = Inches of rise or fall (BC) per foot of length (AB) or per 5′ or 10′ length of conveyor

PER CENT GRADE & EQUIVALENT ANGLE

Per Cent of Grade	Corresponding Angles of Incline 0% Deg	Min	¼% Deg	Min	½% Deg	Min	¾% Deg	Min
0%	0	0	0	9	0	17	0	26
1	0	34	0	43	0	52	1	0
2	1	9	1	17	1	26	1	35
3	1	43	1	52	2	0	2	9
4	2	18	2	26	2	35	2	43
5	2	52	3	1	3	9	3	17
6	3	26	3	35	3	43	3	52
7	4	0	4	9	4	18	4	26
8	4	34	4	43	4	52	5	0
9	5	9	5	17	5	26	5	34
10	5	43	5	51	6	0	6	8
11	6	17	6	25	6	34	6	42
12	6	51	6	59	7	7	7	16
13	7	24	7	33	7	41	7	50
14	7	58	8	7	8	15	8	23

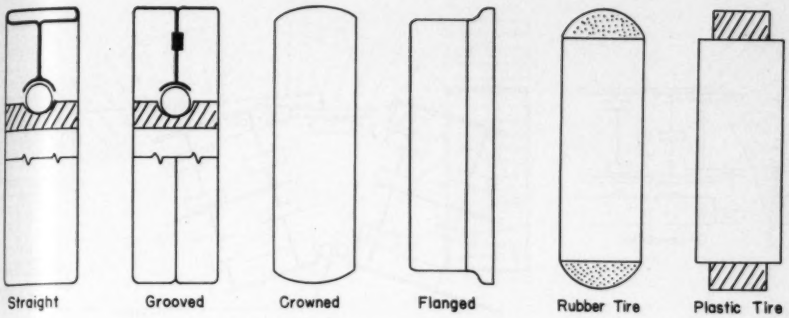
REQUIRED GRADE & PITCH

Article	Weight Range	Per Cent of Grade	Grade and Pitch Pitch (Rise or Fall) Conveyor 5′	Length 10′
Cartons	3 lb – 7 lb	7	4″	8″
	7 lb – 15 lb	6	3½″	7″
	15 lb – 50 lb	5	3″	6″
Crates	20 lb – 125 lb	4½–5	2¾″	5½″
Wood Cases	20 lb – 50 lb	4	2½″	5″
	50 lb – 150 lb	3½	2¼″	4½″
	150 lb – 250 lb	2½–3	2″	4″
Lumber	Boards	4	2½″	4″

PITCH AND EQUIVALENT VALUES

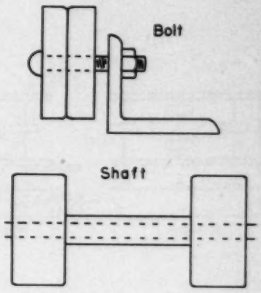
Rise or Fall per Foot	Per Cent of Grade	Corresponding Values Angle of Incline Deg	Min	Conveyor Section Per 5′ Length	Per 10′ Length
¼″	2.08%	1	11	1¼″	2½″
½″	4.17%	2	23	2½″	5″
¾″	6.25%	3	35	3¾″	7½″
1″	8.33%	4	46	5″	10″
1¼″	10.41%	5	57	6¼″	12½″
1½″	12.50%	7	8	7½″	15″
1¾″	14.58%	8	18	8¾″	17½″
2″	16.67%	9	28	10″	20″

GRAVITY WHEEL CONVEYORS



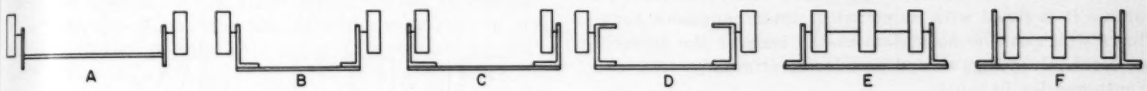
TYPICAL WHEEL FACES

Package, or so called "skate wheel" conveyors are so widely used for packages weighing up to 70 or 80 lbs that it is not always realized that wheel conveyors are also made to carry much heavier loads. Rated capacities of wheels range from 20 to over 300 lbs, and their diameters from 2 to 8 inches. They are also available with a variety of faces as shown above to meet practically any requirement. Fragile surfaces can be protected by the use of rubber or plastic tires.



WHEEL MOUNTINGS

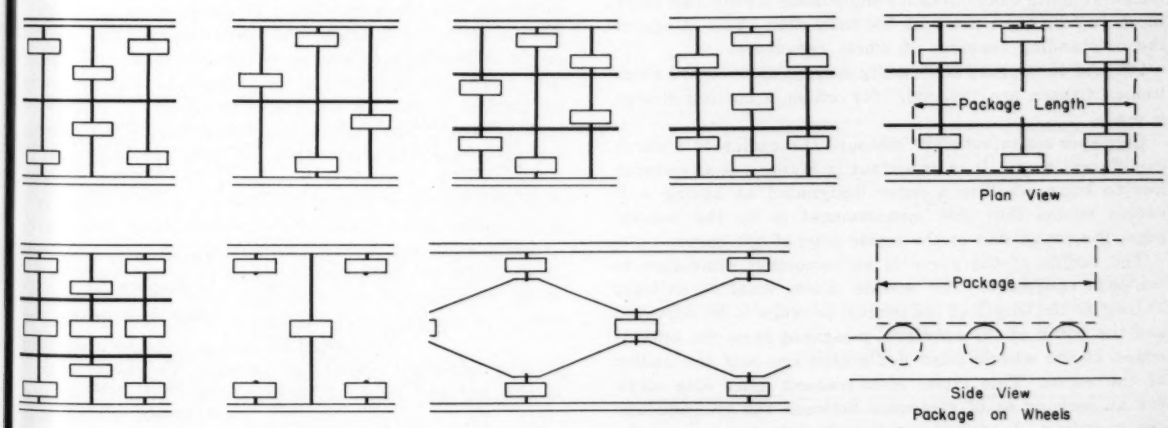
Wheels are mounted in two ways —on bolts or on shafts. The former method is used when there are relatively few lines of wheels. As shown below, they can frequently be combined effectively.



TYPES OF FRAMES AND WHEEL SETTINGS

A conveyor frame is designed to support a specified load. The materials used are strip metal (A), angles (B, C, & F) and channels (D & E). If the wheels are set low as in F, the frames act as guardrails. This is not a satisfactory arrangement where curves are used. With the wheels set high (A, B, C, D, & E) packages wider than the frame can be conveyed satisfactorily and easily.

Either high or low wheel settings can be used in any of the frames shown, except where wheels are bolt-mounted on the outside of the frame (as in A, B & D). Aluminum frames are used where lightness is a desirable feature.

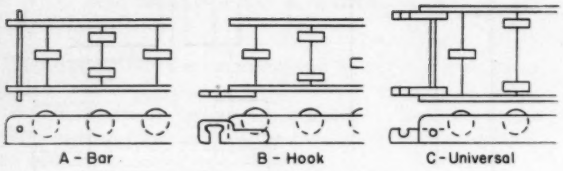


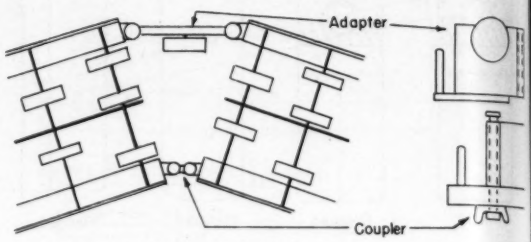
WHEEL ARRANGEMENTS AND MINIMUM REQUIREMENTS

Package conveyors are offered in a variety of standard widths and lengths. The number of wheels per foot of length and their arrangement are optional. Rated capacities are for average package handling operations.

The two views, plan and side, shown above illustrate that **there must be at least six wheels under a package at all times.** If mixed loads are to be conveyed, the arrangement of the wheels are determined by the dimensions of the smallest package, three in the direction of travel, two crosswise.

WHEEL CONVEYOR ACCESSORIES



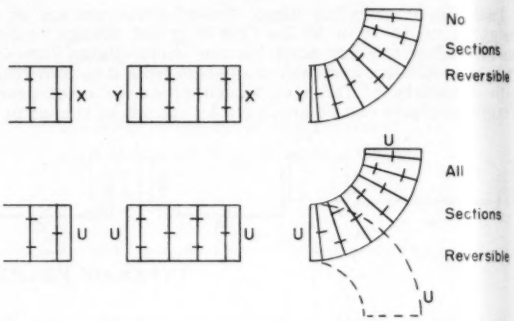


D - Coupler - Adapter

COUPLINGS ARE IMPORTANT

Most conveyor manufacturers have their own distinctive couplings for joining sections of frames together. It is usually impractical to mix units of different makes in the same line.

The type of coupling used is not of any particular concern in setting up an original conveyor line, but difficulties may arise if a new arrangement becomes a necessity. As shown in the illustration, a 90° curve cannot be reversed unless it is fitted with universal or interchangeable couplings which can be hooked-up to the ends of the adjacent sections. Couplings should be selected originally with such contingencies in mind.



WHAT HAPPENS ON CURVES

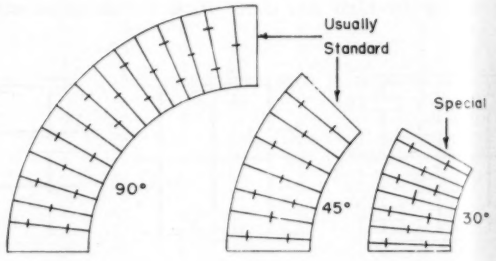
When a package moves around a curve its outside edge covers a greater arc than its inside edge. Wheels mounted radially turn as independent units. They provide the necessary differential action to permit the package to follow the curve quite easily because the outside wheels can move more rapidly than those at the near side. This is one of the outstanding features of wheel conveyors.

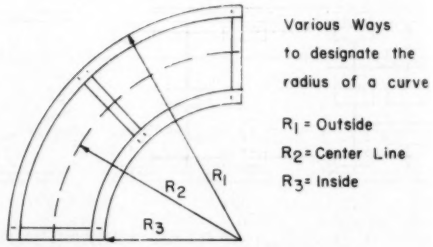
90° and 45° curves are usually carried as standard stock items. Others are "special," for which a cutting charge is made.

Conveyor manufacturers measure the radius of a curve in different ways. It is important in laying out a conveyor line to know whether a curve designated as having a 4' radius means that this measurement is to the outside edge, the center line or the inside edge of the curve.

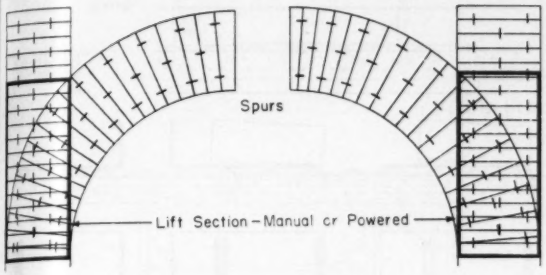
The radius of the curve is an important dimension in conveyor operation. The outside radius must be at least as long as the length of the longest package to be conveyed and the width of the conveyor, measured from the outside edges of the wheels must not exceed one-half the radius of the curve. This latter measurement must also allow for an inch or so of clearance between the package and the guardrail. In actual practice, it is best to err on the generous side in selecting the radius for a curve to meet given conditions. The greater the curvature the easier the packages will follow it.

Some types of couplings have sufficient play to permit a slight deflection in the line of travel, but unless some special form of adapter is used (see coupling D) the practice is not recommended because when packages pass over such a junction point they tend to continue moving forward in their original line of travel. They gradually "creep" toward the edge of the conveyor and to fall off unless guardrails are provided.





MORE CURVES FOR WHEEL CONVEYORS



SPURS AND "Y" SWITCHES

Because of their inherent structural characteristics, it is all but impossible to deflect the flow of packages from wheel conveyors without the use of special devices. A short section of chute at the end of a section can be used to lead the flow to another line, but there are more refined methods.

Spurs are used to deflect the flow from or to a straight line. The spur is usually a 45° curve, but can be changed to a "special" to provide any desired curvature. In the section common to both lines are wheels so mounted that they can be raised manually or electrically when deflection to or from the spur is desired. The wheels are kept lowered when flow is along the straight section.

In much the same manner "Y" switches accomplish divergence either manually or electrically. So-called "flip" switches are manually operated. Flow through "Y" switches can be in either direction.

SUPPORTS AND PORTABLE BASES

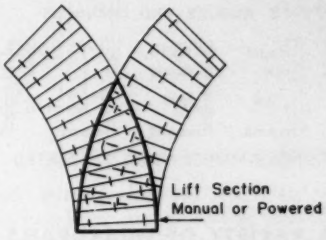
Supports for sections of wheel conveyors are offered in various basic heights with allowances for vertical adjustment. For floor-mounted lines one more stand must be ordered than the number of sections planned. It is also necessary, in most instances, to provide a single leg support to be placed centrally under each curved section. Floor locks keep castered supports firmly set where desired.

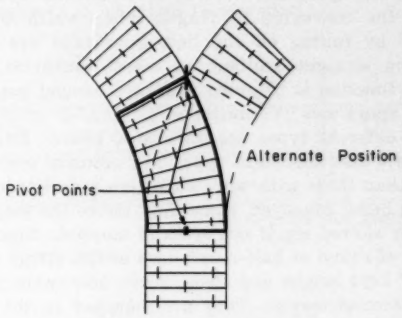
A gravity wheel conveyor intended to permit free flow of articles must decline continually, which means that there is a limit to the length of such a line. For example, a line which starts at an elevation of 48" and which drops ½" per foot will have declined to an elevation of 18" in 80 feet. Should there be curves in the line, this point will have been reached in less than 80'.

Restoration of elevation is accomplished by placing powered belt conveyors, called "boosters," in the line at appropriate points.

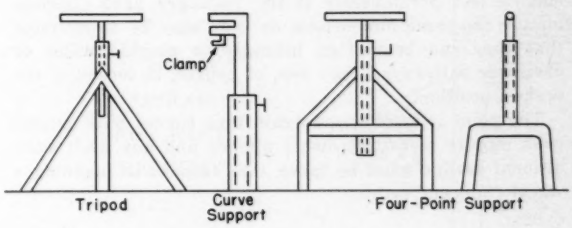
Caster-mounted sections are particularly useful in providing mobility.

Additional supports are shown in the next section—Gravity Roller Conveyors.

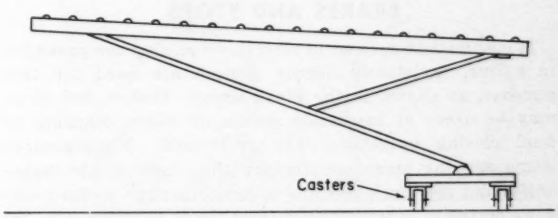




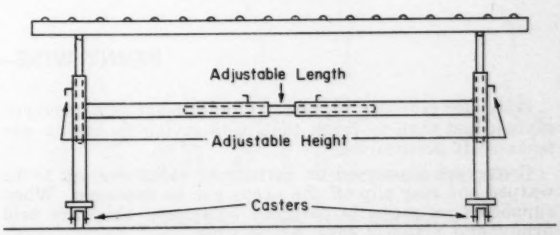
"Y" FLIP SWITCH

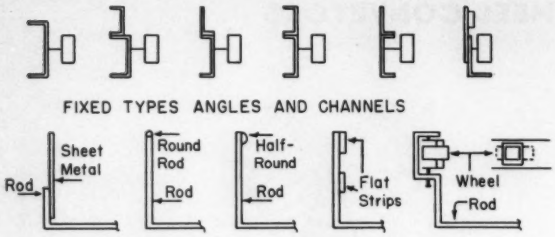


EXAMPLES OF SUPPORTS



PORTABLE BASES





A VARIETY OF GUARDRAILS

Unless the operation involves some unusual conditions, such as the conveying of fragile items which would be damaged by falling off the line, guardrails are not installed on straight sections of wheel conveyors. Their primary function is to guide packages around curves and through spurs and "Y" switches.

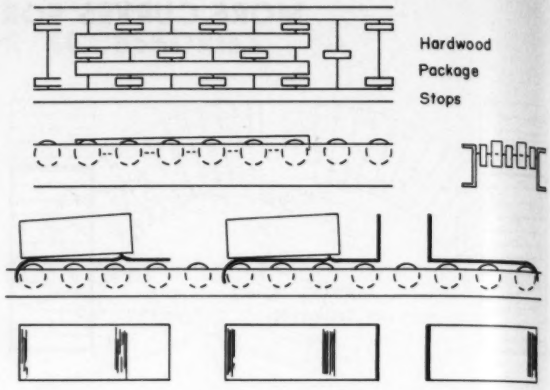
Three different types are illustrated above. Experience has shown that the plain types are actually more satisfactory than those with wheels. Where a variety of packages are being conveyed, some may strike the wheels and be unduly slowed up, if not actually stopped. The smooth surfaces of round or half-round bars or flat strips of sheet metal, if kept bright and clean, serve admirably to guide articles around curves. They are mounted on the outside edges of curves.

Guardrails may be fixed or adjustable. That is, they may be set permanently if the packages have approximately the same dimensions, or they may be so mounted that they can be shifted laterally to provide wider or narrower pathways. They can, of course, be locked in the desired position.

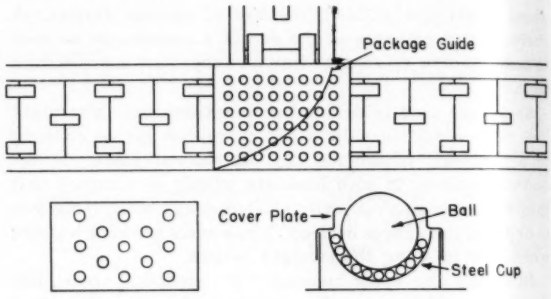
The point is emphasized again that curves with guardrails require more-than-usual pitches and any such additional decline must be taken into account in planning a wheel conveyor setup.

BRAKES AND STOPS

It is sometime desired to slow down or stop the packages in a line. Relatively simple devices are used for this purpose, as shown in the illustrations. Brakes and stops may be used: at inspection points or where marking or final closing operations are performed. Manufactured items are far more satisfactory than home-made makeshifts and are much less apt to cause damage to the packages or their contents. Additional types are shown in the next Chapter.



PACKAGE STOPS



BALL TRANSFERS A HELP

BALL TRANSFERS

A ball transfer is a device consisting of a steel supporting base on which are mounted steel balls (usually 1" to 2" in diameter) which ride on ball bearings carried in a hardened steel cup. A steel cover plate partially surrounds each ball and serves to keep it in place and as a scraper to keep the ball clean.

Ball transfers are used to transfer packages horizontally in any direction and without turning them. Their use is limited, however, to objects with smooth, hard riding surfaces. They are not recommended for use with fibre cartons.

They are offered in a variety of ball sizes and ball center spacings. They are rated according to the load capacity per ball. At least nine balls are required under the smallest package to be transferred.

PENNY WISE—POUND FOOLISH

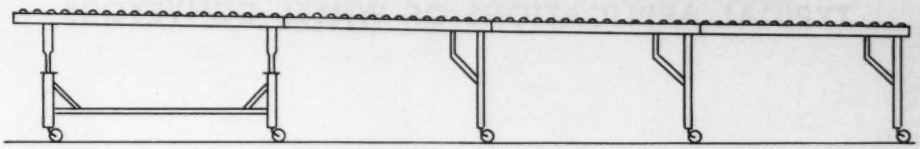
It is poor economy to make an investment in a conveyor system and then to think that it is saving money to use make-shift accessories.

Conveyors supported on cartons or cases are apt to be warped and may slip off the props and be damaged. When supported on properly designed equipment they are held firmly and actually save set-up time.

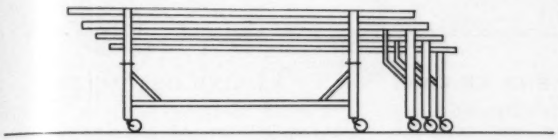
When the correct couplings are not provided, workers are apt to fasten sections together with pieces of wire or string. They are not to be blamed if they try to do the best with what they have.

Many of these same accessories are used with roller conveyors and more are described in the next section.

SPECIAL TYPES OF WHEEL CONVEYORS



FOUR SECTIONS EXTENDED



EXTENDABLE CONVEYOR

Telescopic wheel conveyors find their most important application in loading and unloading operations. Equipped with a "flopover" curve, the manufacturer states that the conveyor can be set up in a box car in less than 30 seconds and reversed in less than 15 seconds .

IMPORTANT FACTORS IN SELECTING WHEEL CONVEYORS

Three all-important factors determine the selection of gravity wheel conveyors for a given job:

1—Size (dimensions) of the articles to be handled.

2—Weight of heaviest article.

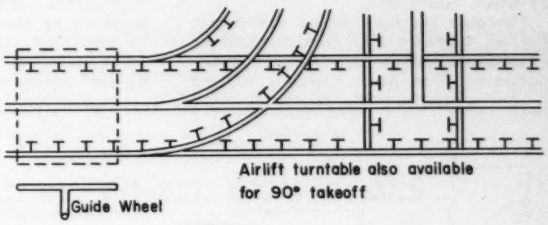
3—Nature of the contacting surface.

The area of the articles to be carried on wheels determines the number of wheels required per foot. As shown previously, there must be at least six wheels under each article at all times. The smallest items to be conveyed is the determining factor.

Weight is important, not only from the standpoint of wheel capacity, but also because the frame must be able to support a fully loaded section.

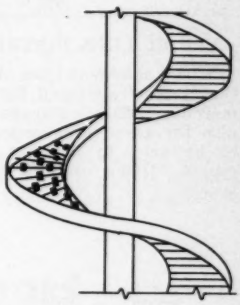
The contracting surfaces of the conveyed objects must be smooth and firm.

A scale drawing on cross-section paper is the best method to use in laying out a conveyor system. Show all columns and other important physical features. This technique is the best method for planning the right couplings at the end of each section of conveyor. In making such a sketch, it is most important to know the method used by the conveyor manufacturer in designating the radii of curves.



GUIDED PALLET SET UP

A WHEEL SPIRAL FOR EASY DESCENT

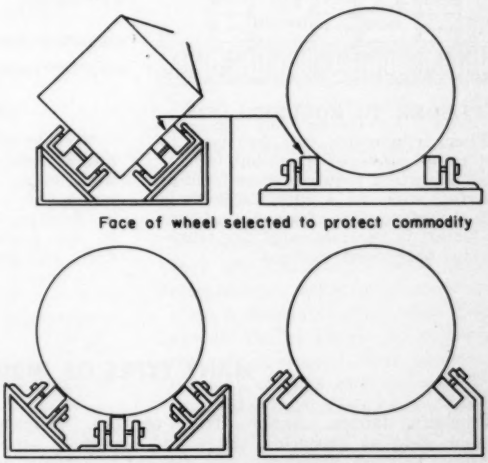


SPECIAL APPLICATIONS

Shown here are a few of the many ingenious ways in which wheels can be used in a variety of combinations for special handling jobs.

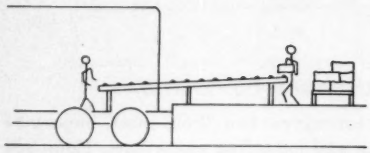
The guided pallet arrangement is designed to permit the conveying of articles on wheels which could not be so handled in any other way. In addition to straight sections, curves, spurs and "Y" switches are available.

The spiral wheel conveyor conserves space and allows the use of lower pitches than are required with spiral chutes. It is, of course, limited to articles which can be handled on wheel conveyors.



SPECIAL JOBS FOR WHEELS

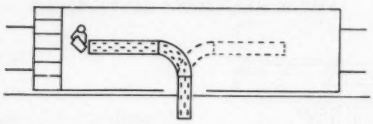
TYPICAL APPLICATIONS OF WHEEL CONVEYORS



LOADING & UNLOADING TRUCKS

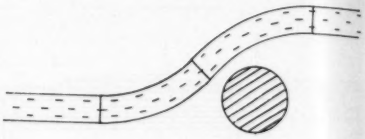
Truck and car operations are considerably speeded up and the work made easier for the men by the use of wheel conveyors.

Portable sections which are easily hooked together and disassembled or extendable conveyors are used for the purpose. The lines running to the



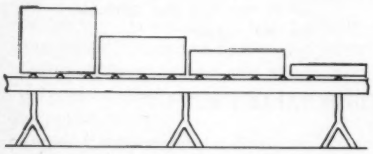
SAME OPERATIONS IN RR CARS

carriers are frequently extended along the loading platform and into the building, thus providing a continuous flow from shipping centers to the carriers, or the reverse, from carriers to receiving points. Spurs and "Y" switches permit selective distribution to one or more carriers.



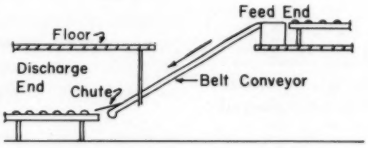
AROUND OBSTACLES

Curved sections make it possible to "snake" around columns or other obstructions. The number of curved sections should be kept to a minimum since every curve added means more pitch in the line. The greater the rate of decline, the more frequent the need for "boosting."



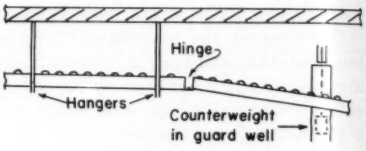
PUSH LINE DISTRIBUTION

Wheel conveyor lines that are practically level are used for distributing merchandise in storage areas and also for assembling orders which are to be sent to packing or shipping points. Often used in place of floor trucks.



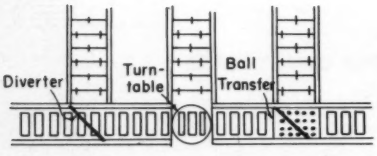
COMBINATION SET UPS

Wheel conveyors are frequently part of a "system." When set at the discharge end of a decline belt conveyor, a short section of metal chute helps to guide packages over the junction point and prevents them from hitting the wheels.



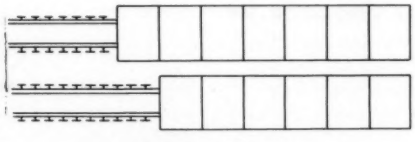
CEILING MOUNTED

Overhead conveyors make good use of what might otherwise be wasted space. They do not obstruct other traffic flow. Sections hinged at one end and counterbalanced at the other provide selective distribution points in the line.



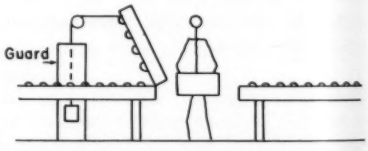
FEEDER TO ROLLER LINE

Wheel conveyors can be used to feed roller conveyor lines, but the reverse operation requires some form of transfer, such as a turn table or a ball transfer. The former, but not the latter, is recommended for transferring fibreboard cartons.



STORAGE LINE

Wheel conveyors resting on or slightly raised from the floor serve as storage lines. Mounted in racks and set at a gentle pitch they provide a "first in, first out" storage facility if fed from the rear and "picked" from the front.



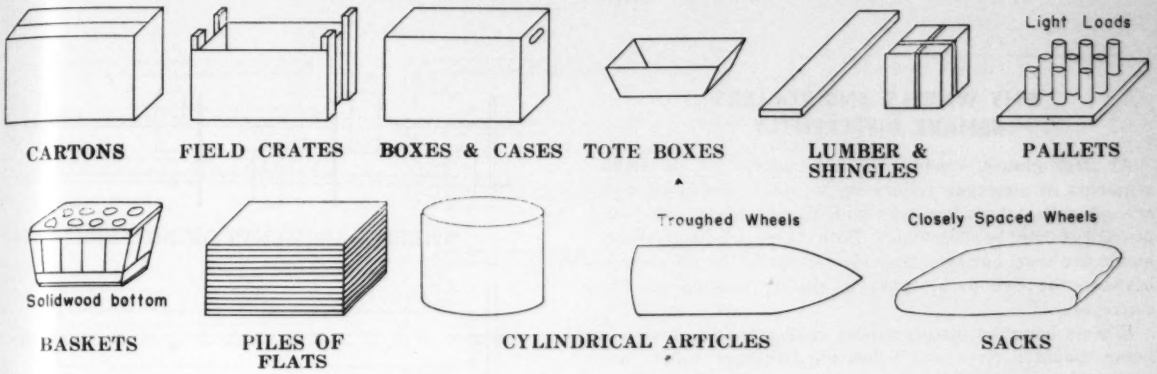
THROUGH THE LINE

One method of providing passage through a conveyor line is shown above. Others, some of them powered, are illustrated in the next section, "Gravity Roller Conveyors," to which the reader is referred for further information on the subject.

MANY TYPES OF INDUSTRIES USE WHEEL CONVEYORS

Truckers, dairies, canners, fruit packers, wholesalers in such field as groceries, drugs and electrical supplies, retailers, bottlers, warehousemen, freight terminals, bookbinders, munition manufacturers, manufacturers generally to handle parts in process and in assembly lines—in fact, practically all industries and kinds of distribution concerns utilize wheel conveyors to move articles which these devices are capable of handling. In general, the articles can be classified as "package freight," but special wheel conveyors can be made up to meet special needs.

ARTICLES HANDLED WELL BY WHEEL CONVEYORS



CARTONS | FIELD CRATES | BOXES & CASES | TOTE BOXES | LUMBER & SHINGLES | PALLETS

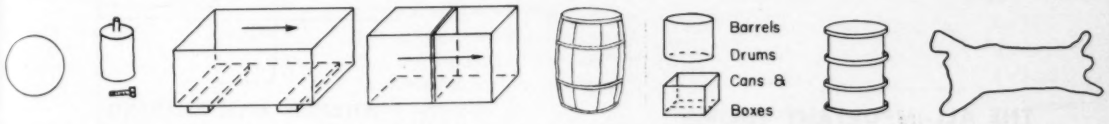
BASKETS | PILES OF FLATS | CYLINDRICAL ARTICLES | SACKS

Developed originally to handle "cross grain" items such as bundles of shingles, wheel conveyors are now used to handle a wide variety of articles with smooth, firm contacting surfaces. Cartons with cleats running lengthwise in the direction of travel can be handled provided the cleats fit between wheels, but they cannot run around curves.

Cylindrical objects can be carried on their sides by bolt-mounted wheels, set at an angle. Only straight runs are possible with long objects.

Sacks with fairly firm walls ride surprisingly well on wheels. This matter is covered more fully in the next Chapter, "Gravity Roller Conveyors."

ARTICLES NOT HANDLED WELL BY WHEEL CONVEYORS

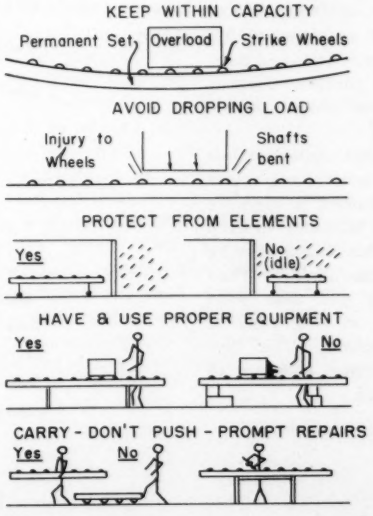


ROUND | SMALL OR FRAGILE | CLEATED OR WIREBOUND | CONTAINERS WITH RAISED BOTTOMS | LIGHT OR FLIMSY

It goes almost without saying that round or small irregularly shaped objects cannot be conveyed on wheels. Nor can pails, barrels or drums with raised (false) bottoms be moved successfully over wheels.

It should be remembered, however, that many of the items which cannot be carried directly on wheels can be handled on this type of conveyor by using pallets of sheet metal, pressboard, wood or other smooth material to carry them.

CARE AND MAINTENANCE OF WHEEL CONVEYORS



Neglect and abuse are the two most frequent causes of wheel conveyor failures. Because of their relative simplicity they are not given the same attention as other, more impressive pieces of equipment. When not in use they are frequently left stored in spots where they are unprotected from the elements. Employees are apt to let them drop and to push them about on their wheels over concrete floors. The manufacturer builds his conveyor with due allowance for normal wear and tear, but he cannot be expected to provide an "abuse" factor.

Overloading a conveyor beyond its rated capacity, or subjecting it to excessive impact due to throwing packages on the line instead of putting them down with reasonable care is bound to bend the axles or shafts, damage the wheels or distort the frame so that it may acquire a permanent "set" which will impair its future usefulness.

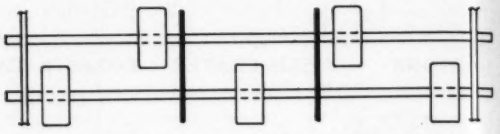
The bearings of most modern wheel conveyors are grease packed, but if they are inactive for some time the maintenance department should give them a thorough going-over. Bent or broken shafts should be repaired or replaced promptly. Each element has its part to play and the surest way to get the longest life from a conveyor is to keep every part in good working condition.

GRAVITY ROLLER CONVEYORS

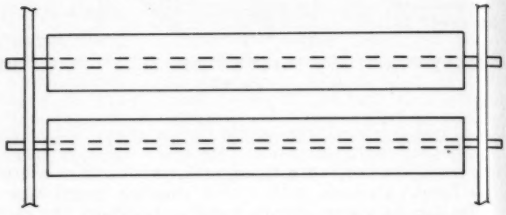
WHY WHEELS AND ROLLERS BEHAVE DIFFERENTLY

At first glance, conveyor wheels appear to be small segments of conveyor rollers or, to put it the other way around, rollers look like very wide-faced wheels. But, appearances can be deceiving. Both these off-hand statements are true, however they over-simplify the differences between the two basic types of rolling friction gravity conveyors.

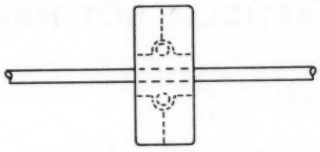
Wheels have the distinguishing characteristic of always being mounted on a single bearing, whereas rollers are invariably carried on two such supports. However, these distinguishing features do not in themselves account for the different actions, from a mechanical standpoint, of wheels and rollers. Picture two wheels mounted twelve inches apart and compare them with a 12" roller. The really significant distinction here is how the space **between the bearings** is utilized. The wheels are connected only by their supporting shaft. On the other hand, the bearings in the roller are joined not only by a shaft but also by **a cylindrical tube.**



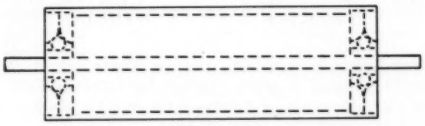
WHEELS—SEGMENTS OF ROLLERS



ROLLERS—WIDE FACED WHEELS



WHEELS—ONE BEARING



ROLLERS—TWO BEARINGS

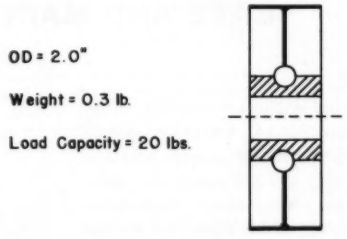
THE ALL-IMPORTANT TUBING

As a basis for comparison between these two types of construction typical examples of each have been selected which have approximately the same outside diameters.

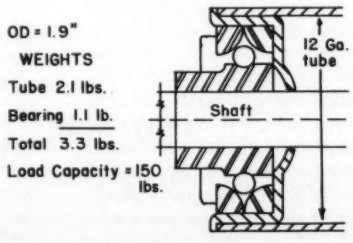
The wheel alone, without any shafting, weighs 0.3 lb. Four such wheels spaced 12 inches apart will weigh 1.2 lb. The bearings in the roller weigh 0.55 lb each, or 1.1 lb for two. The total weight of the 12" roller assembly is 3.3 lbs.

Now observe that the four wheels weigh approximately the same as the two roller bearings. But, the 12 ga. tubing of the roller weighs 2.1 lbs. The significant point is that this added weight in the roller is concentrated near the outside surface of the cylinder. The result is that the greater weight of the roller is centered further from the axis of rotation than the lesser weight of the four wheels.

This all boils down to the simple fact that the roller has greater inertia than the wheels—that it is harder to start it rolling and after it has been put in motion it requires a larger force to stop it, it has a greater tendency to keep on rolling than do the four wheels. This explains why roller conveyors require slightly greater inclines than wheel conveyors to provide free-rolling and also why, when articles follow each other closely on long runs of roller conveyor they attain excessive speeds. The "fly-wheel" effect of the whirling rollers increase the rate of acceleration of the articles being conveyed.

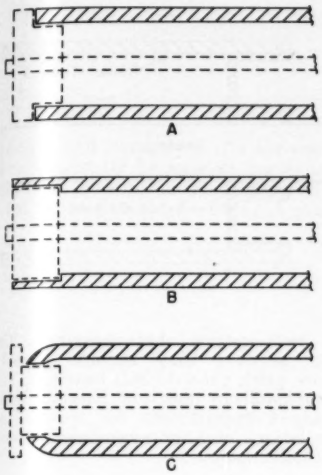


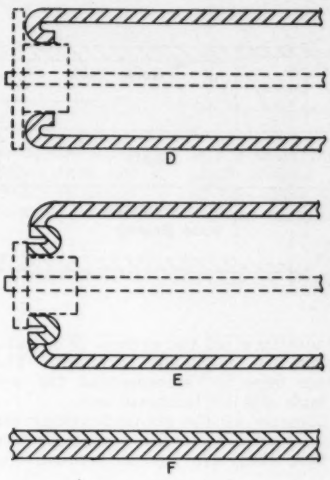
TYPICAL WHEEL

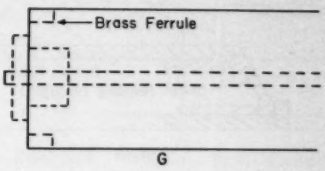


TYPICAL 12-IN. ROLLER

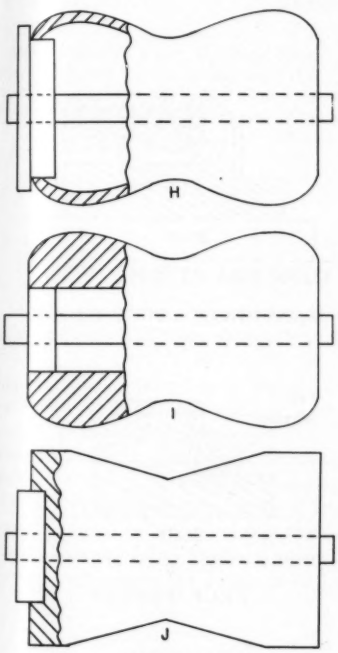
TYPICAL ROLLERS







A—Plain Ends
B—Recessed Ends
C—Tapered Ends
D—Swaged Ends
E—Tapered End With Housing
F—Covered Roller
G—Wood Roller
(Brass Ferrule Optional)



H—Tubing
I—Cast Iron
J—Wood

CONCAVE OR VEE ROLLERS

CYLINDRICAL ROLLERS

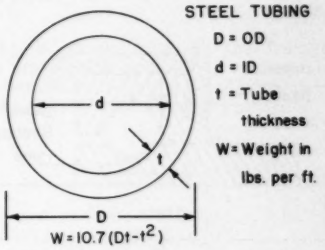
Rollers serve two purposes — to carry the load and to supply support for the bearings. Tubing is the ideal material since it combines strength with lightness.

Welded and seamless steel are the most widely used kinds of roller tubing. Brass is employed where static is a danger, aluminum or magnesium for extra lightness, and wood, plastic or covered rollers where metal would be harmful or unusual operating conditions exist.

Bearings are usually press-fitted into the ends of the rollers. Adapters —also called housings—are used to fit bearings with small diameters into rollers with larger diameters. The outside diameters of rollers determine how closely they can be spaced.

Conical or Vee-shaped rollers are used to convey cylindrically shaped objects — shells, long rods, etc. — lengthwise in the direction of travel.

Tubing thickness is usually stated as a gauge number (Birmingham or Stubs' Wire Gauge). The accompanying table shows the decimal inch equivalent of each gauge number. Sometimes the thickness is given in fractions of an inch and greater thickness as inches and decimal of an inch.

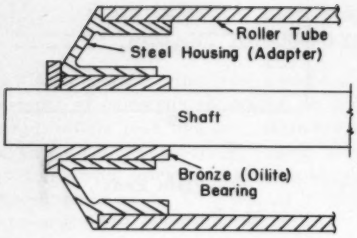


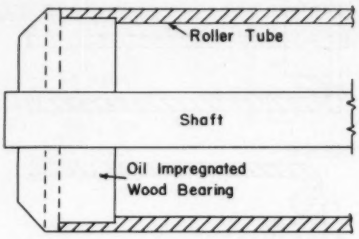
TUBING THICKNESS
GAGE NO. & DECIMAL IN.

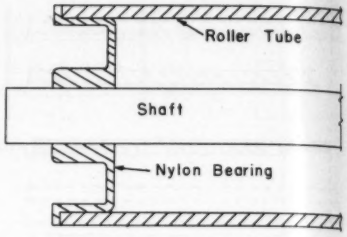
Gage No.	t Inches	t2 Sq. In.
20	0.035	0.001
19	0.042	0.002
18	0.049	0.002
17	0.058	0.003
16	0.065	0.004
15	0.072	0.005
14	0.083	0.007
13	0.095	0.009
12	0.109	0.012
11	0.120	0.014
10	0.134	0.018
9	0.148	0.022
8	0.165	0.027
7	0.180	0.032
6	0.203	0.041
5	0.220	0.048
4	0.238	0.057
3	0.259	0.067
2	0.289	0.081
1	0.300	0.090

TYPES OF BEARINGS

EXAMPLES OF SLIDING FRICTION BEARINGS



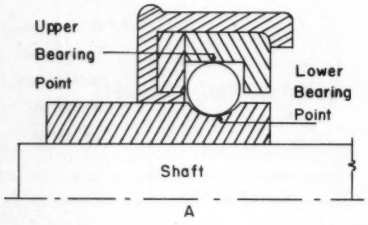




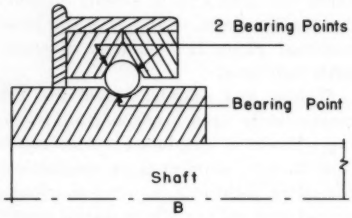
Die-cast bronze, called oilite, and hard wood bearings are both impregnated with oil. The former may require occasional re-oiling. Molded nylon bearings are inherently self lubricating. All are simple in design, rugged, quiet-running and unaffected by moisture, oil and grease. Wood and nylon are corrosion resistant. The latter type is recommended for use in high and low temperatures.

Because all the above bearings are plain, sleeve type with sliding friction action, they are not as free-turning as well-designed ball bearings. On this account they require slightly more pitch than do ball bearings, but this handicap does not prevent their being a requirement for certain installations as, for example, in food establishments.

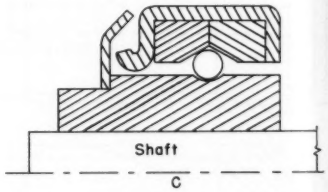
EXAMPLES OF BALL BEARINGS



TWO-POINT CONTACT



THREE-POINT CONTACT



LABYRINTH (DUST PROOF)

Ball bearings consist of hardened steel outer and inner raceways between which are mounted balls which may be made of chrome nickel steel, stainless steel, monel metal or other materials as indicated for particular service conditions. Roller manufacturers who use two-point contact bearings claim that they stand up better under severe impact than do three-point contact types with their two-piece outer raceways. However, the latter are more widely used in rollers than the former.

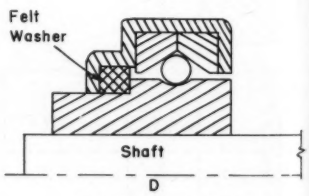
Bearings A and B above are plain and unprotected. They are used where there is little or no dust or moisture.

The labyrinth type, C, offers greater dust protection than A or B because the steel shields act as baffles.

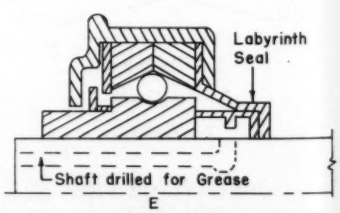
When one or two felt washers are included in the construction, the bearing may be packed with grease by the manufacturer or, if the shaft is drilled for the purpose, can be greased by means of a pressure grease gun.

The steel labyrinth, greasable bearing presents less friction than the felt-washer type and the grease can be forced through the bearing, thus removing dust particles or other objectional accumulations.

Manufacturers of rollers go to great lengths in engineering bearings to rollers. It would be foolish to put a bearing with too low a load rating in a roller which can carry a heavier load—and vice versa. It is a truism that a roller is only as good as its bearings.

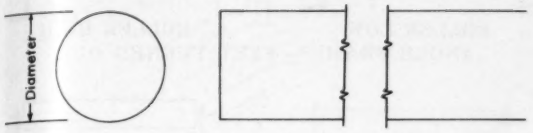


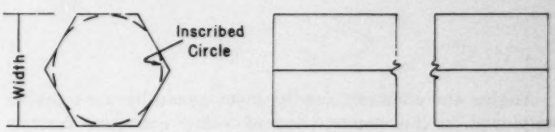
FELT WASHER



STEEL LABYRINTH SHAFT DRILLED FOR REGREASING

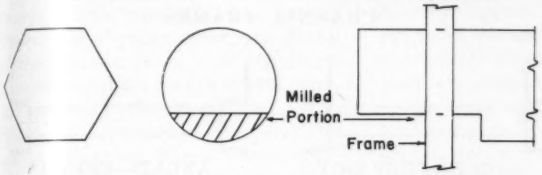
SHAFTS FOR ROLLER CONVEYORS





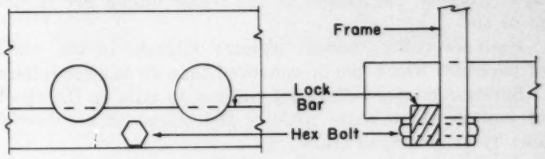
Round and hexagon shafts are used in rollers, the latter more frequently because of the ease with which they are kept from rotating in the frames. A round shaft is designated by its diameter; a hexagon shaft by its width, which is the diameter of the inscribed circle. A steel hexagon shaft weighs 1.1026 times the weight of a round shaft of the same size. Simple as they appear to be, shafts present certain problems as discussed below.

HOW THEY ARE MOUNTED IN FRAMES



HEXAGON IN PUNCHED HEX HOLES

ROUND SHAFT WITH MILLED END IN PUNCHED HALF-MOON HOLE



LOCK BAR HOLDS ROUND SHAFT AND PREVENTS IT FROM ROTATING

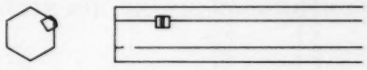
Round shafts must be kept from rotating in the holes punched in the frame to prevent the shaft itself from being worn by contact with the edges of the holes and to keep the holes from being enlarged. One method is to mill the ends of the shaft to fit half-moon holes in the frames. The lock bar shown in the sketch is another solution to the problem. Hexagon shafts have line contact with their punched holes and so are always held firmly in position.

HOW SHAFTS ARE HELD IN FRAMES

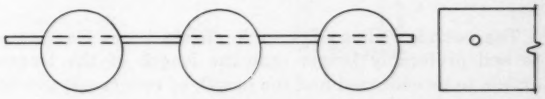
Shafts must not only be kept from rotating but they must be prevented from sliding longitudinally through the rollers. Further, they must be removable so that they may be repaired or replaced. Cotter pins or retaining "pig" rings in both ends of a shaft permits its withdrawal from either end. However, when the end of a hexagon shaft is upset, as illustrated, that particular end cannot be drawn through the bearings. Several patented devices are available to serve this same purpose. For example, one roller manufacturer offers a snap lock. When the end of the shaft is pushed in a spring is compressed, permitting the roller to be lifted from the frame.

COTTER PIN

RETAINER OR "PIG" RING



UPSET END OF HEXAGON SHAFT



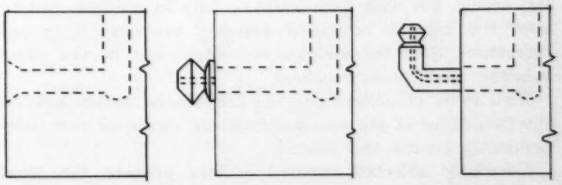
WIRE RUNNING THROUGH HOLES IN HEXAGON OR IN ROUND SHAFT

LUBRICATION FOR BEARINGS

Bearings are lubricated by injecting grease, either with or without the use of fittings, as illustrated.

Grease acts both as a lubricant and as a seal against dust and moisture. The grade should be selected to fit the given operating conditions, especially the ambient temperature.

Special extension provisions for greasing must be provided if the conveyor is so located that the bearings on one side are inaccessible.



WITHOUT FITTING WITH FITTING EXTENSION FITTING

FRAMES AND GUARDRAILS

Angles and channels are the most generally used shapes employed in the construction of roller conveyor frames. They are used alone or in various combinations, as shown by the examples illustrated. The frames themselves can serve as guardrails, or members may be added for the purpose. Adjustable guardrails, such as those described for wheel conveyors are also available.

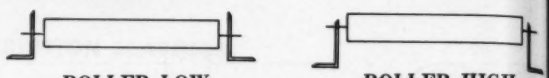
The overall width of a conveyor is important if the conveyor is to fit a given space. The same length roller can be mounted in frames of different width, depending upon whether the flanges of the frame angles are turned in or out.

High-set rollers permit greater latitude in the width of packages which can be conveyed than do low-set rollers.

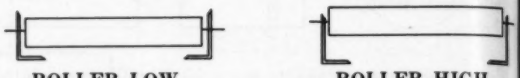
Spring-mounted rollers are utilized to take up the shock of impact where heavy articles are placed on a conveyor line by an overhead crane.

Sometimes rollers are mounted on individual supports to permit the passing of a sling around the article being conveyed.

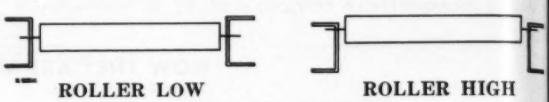
EXAMPLES OF DOUBLE LINE FRAMES



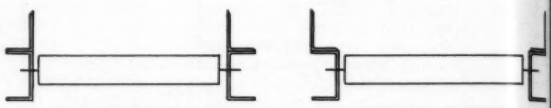
ROLLER LOW ROLLER HIGH
ANGLE FRAMES—FEET TURNED OUT



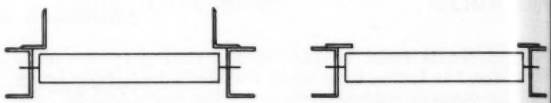
ROLLER LOW ROLLER HIGH
ANGLE FRAMES—FEET TURNED IN



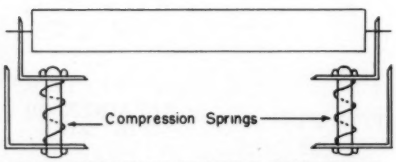
ROLLER LOW ROLLER HIGH
CHANNEL FRAMES



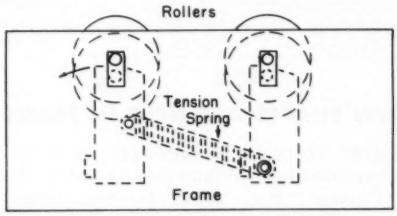
ANGLE—FEET OUT ANGLE—FEET IN
CHANNEL FRAMES—ANGLE GUARDS



ANGLE INSET FLAT PLATE INSET
CHANNEL FRAMES—VARIOUS GUARDS



COMPRESSION SPRING MOUNTED



TENSION SPRING MOUNTED

CURVES WITH VARIOUS KINDS OF ROLLERS

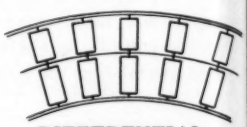
The outside radius of a surve should be at least equal to and preferably longer than the length of the longest article to be conveyed and the length of rollers not greater than half the outside radius with 2" clearance at the guardrail.

Straight rollers mounted in radial lines have no differential action, but with guardrails to help in guiding, can be used for smooth bottomed articles, provided it is not important that the articles be discharged in the same relative position as received.

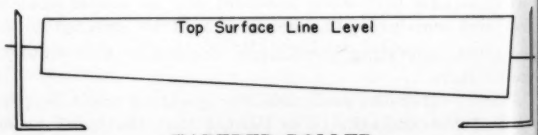
Two rows of rollers provide differential action only if the two edges of the commodity being conveyed rest independently on the two rows.

Carefully selected tapered rollers provide the most satisfactory curve for conveying articles with smooth bottoms. Note that the top surface is horizontal.

STRAIGHT RADIAL ROLLERS

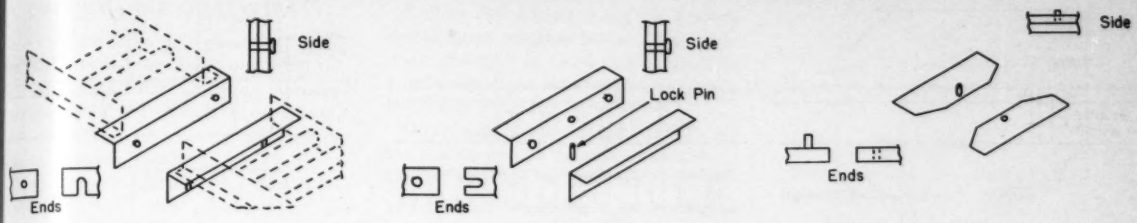


DIFFERENTIAL RADIAL ROLLERS



TAPERED ROLLER

ACCESSORIES—COUPLINGS, SUPPORTS, STOPS, ETC.



MANY TYPES OF COUPLINGS

PROPER ACCESSORIES SPEED HANDLING

Most manufacturers of wheel conveyors of the "package" type have a similar line of roller conveyors. Many of the accessories such as couplings, hangers and supports are interchangeable between the two types. The reader is referred to the previous section "Gravity Wheel Conveyors," for additional examples of accessories.

Package conveyors are limited in the weights they are designed to carry. Their field is usually confined to articles which one man can carry unaided, or up to about 100 lbs.

Roller conveyors are also offered with capacities as great as 10 tons. All the elements of conveyor construction must be engineered to these greater burdens. We find the accessories for such heavy duty service to be very rugged. Couplings, especially for more permanent installations, do not permit quick changes. Many of them are strap-and-bolt types.

The broad surfaces of rollers lend themselves to both manual and powered devices for braking and stopping.

There are innumerable special contrivances such as turntables. Some of these are shown in the installation illustrations.

Roller conveyors are often highly enginered installations. Technical accessories such as package counters, both mechanical and electronic, scales in the line. "traffic cops" and diverters add to the versatility and automatic operation of such systems.

UNIVERSAL STRAP

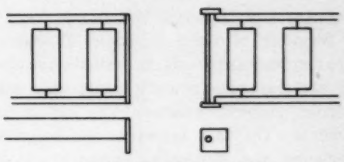
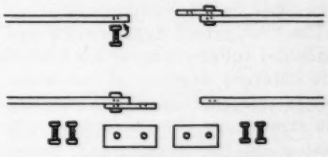
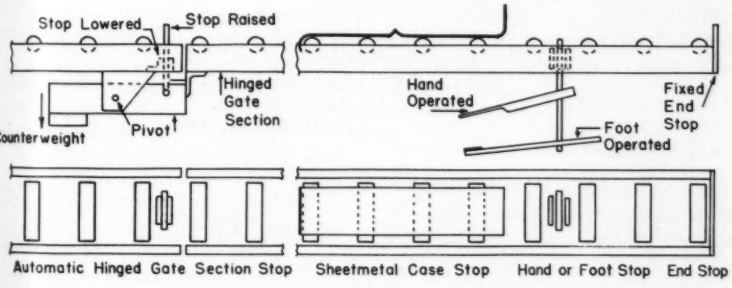
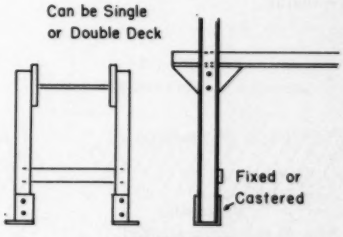


PLATE AND BAR

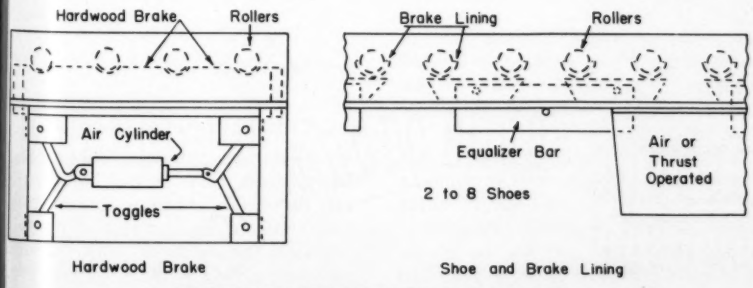


BOLTED PLATE

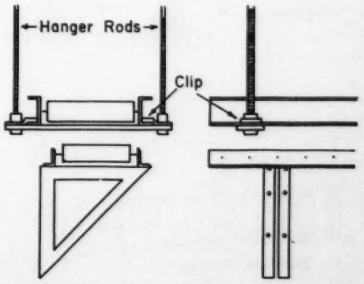




SUPPORTS

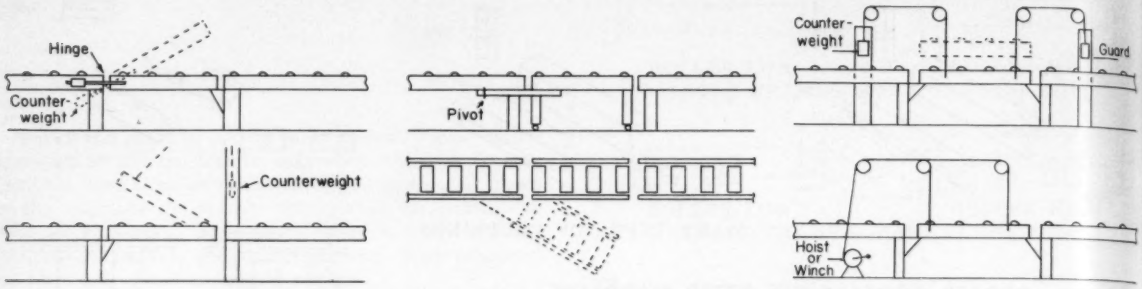


EXAMPLES OF BRAKES AND STOPS



HANGER AND WALL BRACKET

MORE ACCESSORIES—GATES, SPURS, "Y" AND OTHER SWITCHES

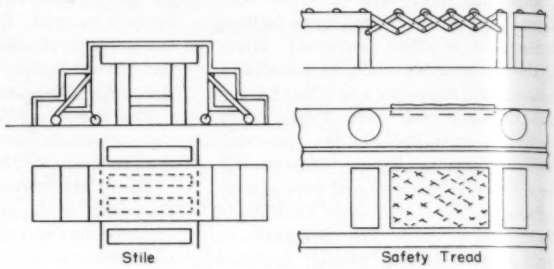


SOME WAYS TO PROVIDE TRAFFIC LANES THROUGH LINES

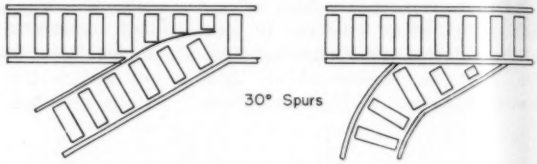
Many of the gates, both manually and power operated described here, are also used as accessories with wheel conveyors. Steps or stiles are sometimes employed to permit employes to pass from one side of a conveyor line to the other. The safest practice, however, is to provide a passageway through the line.

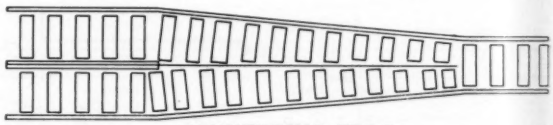
Because of their inherent characteristic—long, smooth bearing surfaces—it is relatively easy to slide packages or articles with smooth contacting surfaces longitudinally across rollers, whereas the action is not practical with wheels. On this account, the construction of frogs, "Y" sections, etc., for roller conveyors is quite simple. Articles being conveyed converge into a common line without any outside assistance, but, when the lines are divergent, they must be guided manually.

The "Alligator" type switch and the "accordion" (extendable) roller conveyor are both flexible units which permit different degrees of curvature. In the former, the rollers ride just clear of a steel plate and are always in the same plane. The accordion rollers are mounted in two pantograph-like frames and, unless provision is made to adjust the heights of the stands, the ends of the rollers at the outside of the curve will be lower than those at the inside.

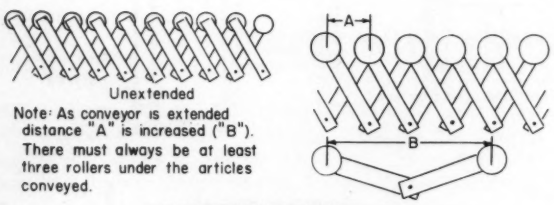


THROUGH AND OVER LINES

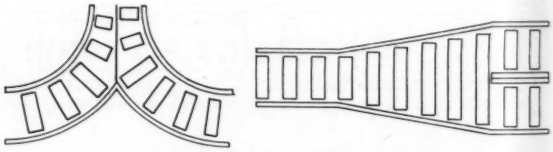




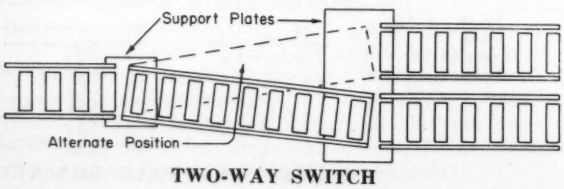
CONVERGING FROG


Unextended
Note: As conveyor is extended distance "A" is increased ("B"). There must always be at least three rollers under the articles conveyed.
A
B

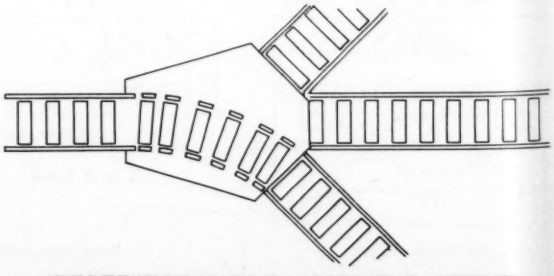
ACCORDION CONVEYOR



MORE CONVERGING LINES



TWO-WAY SWITCH



THREE-WAY RADIAL ALLIGATOR SWITCH

FACTORS IN SELECTING EQUIPMENT

CONVEYABLE QUALITIES

To ride directly on cylindrical rollers, the article must have one smooth, firm surface—a flat plane or runners lengthwise in the direction of travel, with the center of gravity sufficiently low to provide stability.

It is not good practice to mix commodities which vary considerably in dimensions and weight on the same line.

STATIC AND GRAVITY LOAD CAPACITIES

Proposed use—as a level storage or push line or as a free-rolling gravity line—determines the load capacities of bearings, rollers and frames. Greater loads can be supported under static than under gravity line conditions. In the latter instance there is impact between the moving articles and the rollers. The rotation of the rollers themselves also lower load capacities.

ROLLER SELECTION

Should the surfaces of the commodities be subject to damage by riding over the edges of the rollers, the latter should be 2" or 3" wider than the articles. Commodities with firm riding surfaces can overhang the rollers.

Roller surface material is selected so as to prevent damage to articles being conveyed.

Roller spacing should be such that at least three are at all times under the shortest item conveyed. Space rollers as far apart as practical for economy and lowest possible pitch.

Specifications usually give both static and gravity line ratings for rollers. The latter are usually based on 250 rpm. Higher speeds result in lower ratings.

FRAMES AND SUPPORTS

These are rated on the total, evenly-distributed load which a given length of frame is expected to carry. Important factors are the materials used, whether two- or three-rail construction and the span or spacing between the supports.

Rollers are set low when the frames are to serve as guardrails. High settings are used in most level lines and in gravity lines where the packages are wider than the rollers.

Guardrails, adjustable preferred, are placed on the outside of curves to help in guiding the packages.

ENVIRONMENT IMPORTANT

Unusual environmental conditions such as extremes of heat or cold, high humidity, presence of corrosive agents, dust or explosive mixtures or where sanitary needs must be met, all require special study and the advice of manufacturers should be sought in selecting bearings, rollers, etc., to meet the situation.

PITCH AND LENGTH OF LINE

The length of a roller gravity line, without restoration of elevation, is dependent upon the pitches required to secure free-rolling in the various elements. The type of bearing, spacing of the rollers, number of curved sections, contact with guardrails and even environmental conditions such as heat or cold affect the amount of pitch. With so many variables in the picture, the following must be considered as suggestive rather than hard-and-fast rules.

Grease-Sealed Ball Bearing Rollers

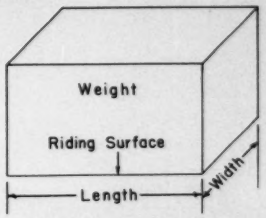
From ¼" to the foot for heavy, smooth-bottomed metal products to as much as ⅞" to the foot for very light cartons. Usual range is ⅜" to ½" per foot for medium duty conveying.

Additional Pitch Needed

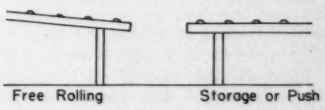
Plain bearing (oilite as much as 50% more), those with felt washers and bearings operating in extreme cold require additional pitch.

Converging and tapered roller sections, guardrails and curves may need as much as 50% increase in pitch and roller spirals 100%.

Wherever practical, the best practice is to test-run the articles to be conveyed under actual operating conditions.

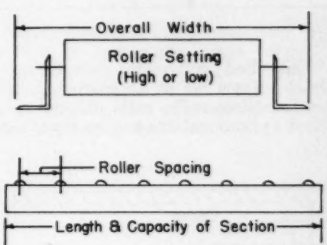


COMMODITIES

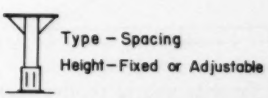


OPERATION

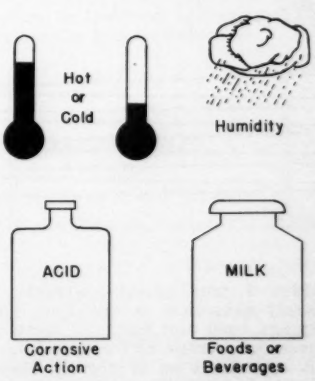
ROLLER ASSEMBLY



FRAMES



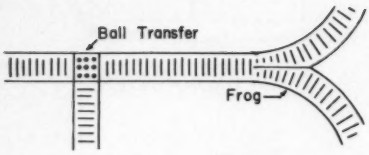
SUPPORTS



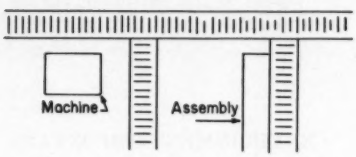
SPECIAL CONDITIONS

TYPICAL AND SPECIAL APPLICATIONS

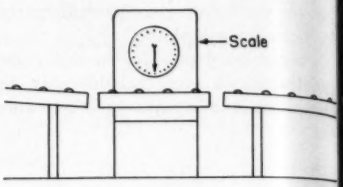
EXAMPLES OF FREE ROLLING



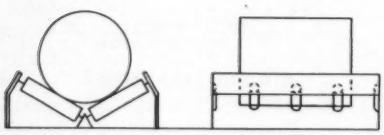
Through the use of ball transfers for right angle diversion and spurs, "Y" sections, etc., practically any desired roller conveyor line setup can be worked out.



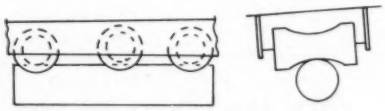
Handling tote and shop boxes to and from production, inspection and assembly centers has added much to speed the flow of materials through production processes.



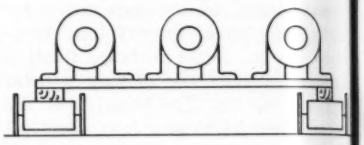
In-line weighing is another application where roller conveyors are used to keep materials flowing almost continuously and with minimum handling by workers.



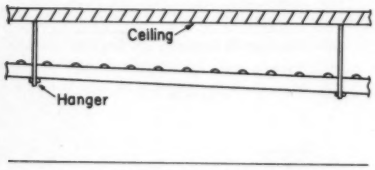
Troughed conveyors made up of short rollers set at an angle are ideal for handling coils, rolls of paper, and other cylindrical shapes on their sides.



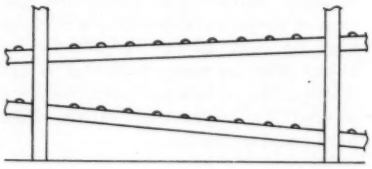
Concave and Vee rollers handle shells, lengths of pipe and lumber successfully over straight sections but the method is not applicable to curves.



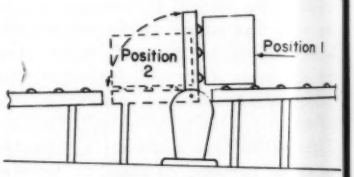
Double lines of rollers on the same or different levels can be used to convey suitable odd-shaped items or items carried on special skids.



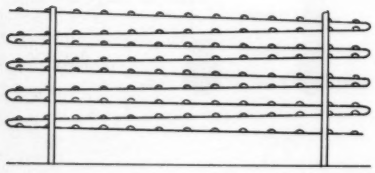
A favorite way to receive such articles as beverage cases at the receiving platform which also incorporates the means of delivering out to the same point.



Suspending roller gravity conveyors from the ceiling by hangers provides a means of distributing materials without interference with other lines of traffic.

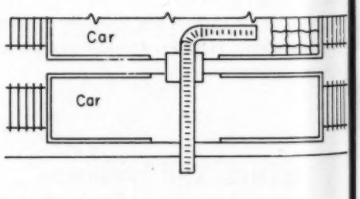


Up- and down-enders are used to change the positions of coils, drums and similar objects by turning them through an arc of 90°. Hand or powered models are available.



Not a true spiral conveyor, but closely akin to it is this type which zigzags back and forth. It conserves space for storage or for such in-process operations as drying or cooling. Must, of course, be engineered to the job.

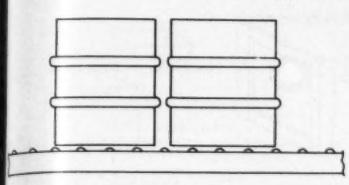
Although roller spirals require more pitch than straight sections they require less pitch than do spiral chutes. They are widely used for lowering such articles as drums. Must be carefully engineered to meet given conditions.



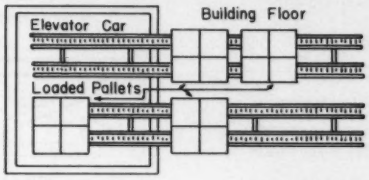
Portable sections are widely used in loading and unloading carriers — trucks and cars. Extendable (accordion) sections are useful in supplying curves which are adjustable on the rail or truck platform or in either type carrier.

TYPICAL AND SPECIAL APPLICATIONS

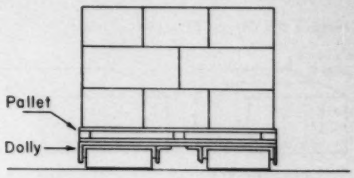
PUSH AND STORAGE LINES



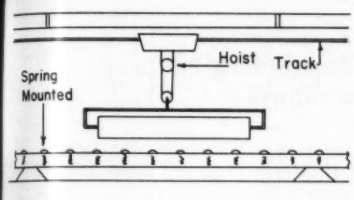
Drums, coils, sheets of corrugated paper, piles of hides and similar objects are frequently stored on roller lines. Small sections of rollers riding on wheels or casters are often used to distribute to the lines.



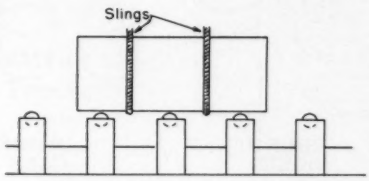
Sections of roller conveyor laid on the floor of buildings and which meet similar sections on the floors of elevators are being used with marked success to handle loaded pallets on and off elevators.



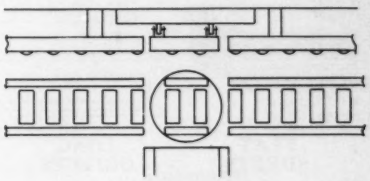
Pallet dollies which have sections of roller conveyor as the running gear are used to handle unit loads in and out of trucks. Special roller-top dollies are used to move pallet loads in freight cars.



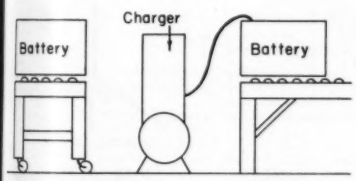
It is frequently necessary to transfer heavy objects via overhead crane to a conveyor line. Spring mounted rollers are used to take up the shock of impact when the articles are deposited on the conveyor.



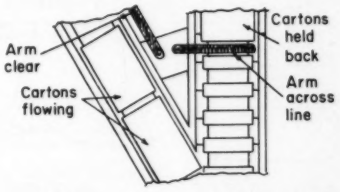
In instances where it is required to pass slings or strapping material around articles on a conveyor line, the frames may interfere with the operation. Individually mounted rollers provide a solution to the problem.



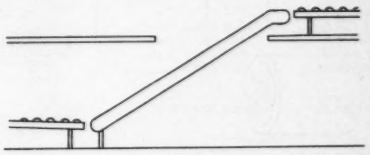
Ball transfers are not the only answer to how right-angle turns can be made. Several different types of turntable with a roller section which turns horizontally offer another means which is used effectively.



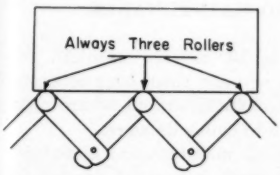
Sections of roller gravity mounted on portable stands are used to remove batteries from and feed them into powered industrial trucks. Stationary sections are also used to hold batteries during charge.



Interference of packages on converging lines can be controlled by means of "traffic cops" which may be manually, electronically or remotely operated. Either line can be held back to permit flow from the other.



Roller gravity conveyors are widely used in combination with powered "boosters," either to restore elevation to the gravity line or for floor-to-floor raising or lowering operations. They are usually belt conveyors.



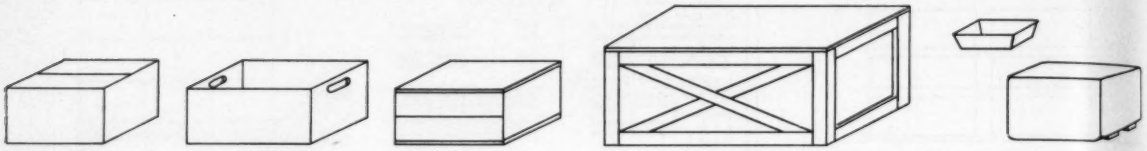
Portable sections of accordion roller conveyors are governed by the three-rollers-under-a-package rule. Care must be taken that the outside edges of curves do not pitch downward, which tends to throw the packages off the line.

INDUSTRIES WHICH USE ROLLER GRAVITY

Their ability to handle a wide variety of articles and their high load-carrying capacities mean that roller conveyors are utilized in many industries where wheel types are not applicable. For example, roller conveyors are widely used in foundries to handle molds and castings. They are standard equipment in steel mills to handle ingots and sheets, to mention only a few of many products. In the petroleum field they are used to move and store drums, cans and pails.

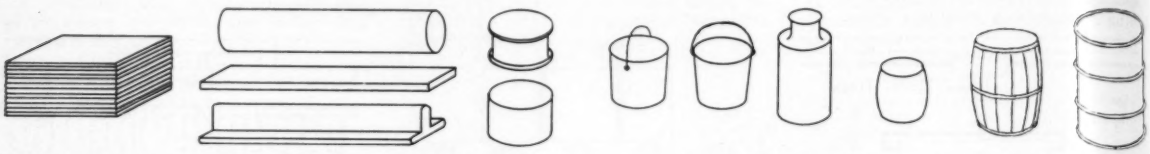
These somewhat specialized applications should not overshadow the countless installations, permanent in nature, in warehouses, all types of wholesale and retail houses, beverage and food plants, canners, and countless other type industries.

PACKAGES HANDLED WELL BY ROLLER GRAVITY CONVEYORS



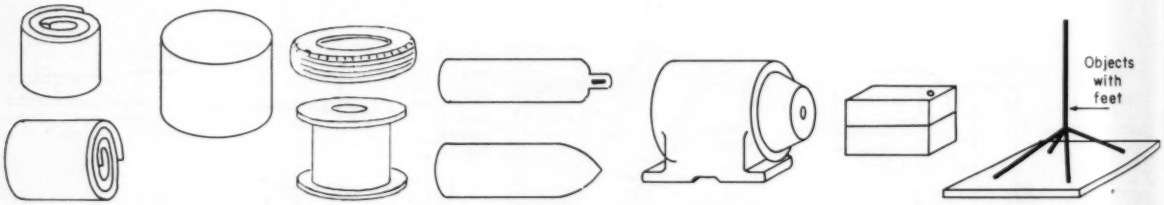
CARTONS CASES WOOD BOXES CRATES TOTE BOXES HAMPERS

In order to ride well on rollers, the bottoms of the above articles should be reasonably firm and any protrusions such as runners, cleats or wire strapping should extend lengthwise in the direction of travel. Cartons should be as dry as possible. When damp, they may be "mushy" and lap around the rollers, thus tending to slow down the flow.



FLAT SHEETS LONG OBJECTS ROUND BOXES MISCELLANEOUS CANS AND PAILS BARRELS AND DRUMS

Cylindrical shaped containers with sufficiently low centers of gravity and smooth, solid bottoms offer no difficulties to roller conveying. Those with raised bottoms which ride on their rims make point rather than line contacts with the rollers. In order to provide proper stability when such articles are to be conveyed on their ends, it is advisable to space the rollers more closely than is required for flat, rectangular-shaped containers.



COILS, TIRES, REELS, CYLINDERS AND SHELLS MOTORS MOLDS PALLETS

Coils are handled either on their sides by troughed roller conveyors or on their ends by the regular types. Of course, the riding surface of the ends must be free of protruding pieces which might catch on the rollers and there must be sufficient area in relation to height to provide stability.

Many molds and castings have sufficiently smooth riding surfaces to permit their being conveyed directly on rollers. If this ideal condition does not hold they, like other irregularly shaped articles, can be conveyed on pallets.

BAGS ON ROLLERS AND WHEELS

Bags or sacks on rollers, as shown in the side view above, tend to "droop" over the rollers and all flow may stop. The surfaces of bags on wheels, see end view above, are stretched sideways and there is practically no tendency to wrap around the wheels. Consequently, bags ride quite well on wheels. Of course, the wheels must be closely spaced and there must be added pitch in order to provide free-flow for bags, even on wheels. These factors depend upon the texture of the bags—cloth, multi-walled, etc.

CARE AND MAINTENANCE

Common sense care is, of course, essential. Workers should not drop sections or push them over concrete floors on their rollers. Sudden impacts, except where rollers are spring-mounted, are sure to cause damage.

From the standpoint of maintenance, cleanliness and lubrication are the two most important factors. Rollers equipped for pressure greasing are the easiest to keep clean because, as the grease is forced through the bear ings it carries with it any objectionable accumulations. However, the servicing must be done at regular intervals to be effective. Grease fittings must be located where they will be accessible for maintenance.

STATISTICAL DATA

MATERIALS HANDLING EQUIPMENT

Conveyors and Conveying Equipment

Except overhead traveling cranes and monorail systems

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Farm elevators, portable		
Single chain	18,732	$ 2,888,000
Double chain	18,032	5,931,000
Auger type	19,250	2,356,000
Farm, elevators, stationary	1,301	603,000
Parts and attachments, and those not reported by type	....	4,363,000
Conveyors and conveying systems	....	142,573,000
Gravity conveyors (skate wheel and roller)	....	10,262,000
Power conveyors (excluding overhead trolley systems, pneumatic tube systems, and portable conveyors)	....	17,604,000
Overhead trolley conveyor systems	....	10,904,000
Pneumatic tube systems (incl. foot-power units)	....	2,200,000
Portable conveyors (except farm)	....	14,583,000
Other conveyors and conveying systems	....	87,020,000
Parts, attachments, and accessories sold separately	....	34,754,000
Conveyors and conveying equipment, not reported by type	....	3,364,000
Total—1947	....	$196,832,000
Total—1950	....	$181,137,000
Total—1951	....	$254,732,000
Total—1952	....	$280,737,000
Total—1953	....	$299,265,000

Shipments of Industrial Electric Trucks and Tractors

	1954	1953	1952	1951	1950
Jan.	523	704	658	440	199
Feb.	467	779	681	461	183
Mar.	473	832	702	595	229
Apr.	366	732	643	397	204
May	445	677	652	464	203
June	445	945	648	604	268
July	413	673	394	538	199
Aug.	357	626	564	591	237
Sept.	357	797	516	447	263
Oct.	348	877	588	587	290
Nov.	359	677	622	728	242
Dec.	394	673	741	673	291
Total	4,947	8,992	7,409	6,525	2,808

Industrial Trucks, Tractors, Trailers & Portable Elevators

Industry Division, Bureau of the Census

Type	Quantity (Units)	Value f.o.b. Plant
Powered trucks, operator walking	7,469	$ 8,053,000
Powered trucks, operator riding	20,385	66,437,000
Fork trucks	17,943	56,970,000
Electric (storage battery and gasoline-electric powered)	3,522	15,212,000
Gasoline powered	14,421	41,758,000
Other trucks	2,442	9,467,000
Electric (storage battery and gasoline-electric powered)	1,300	5,667,000
Gasoline powered	1,142	3,800,000
Tractors	2,460	3,890,000
Electric (storage battery and gasoline-electric powered)	199	367,000
Gasoline powered	2,261	3,523,000
Portable elevators[1]	4,653	3,162,000
Hand trucks and trailers	....	29,430,000
Hand lift	....	8,373,000
Other[2]	....	21,057,000
Parts, attachments, and miscellaneous equipment, sold separately[3]	....	41,572,000
Industrial trucks and tractors, not reported by type	....	4,210,000
Total—1947	....	$156,754,000
Total—1951	....	$285,248,000
Total—1952	....	$322,166,000
Total—1953	....	$321,843,000

[1] Does not include farm elevators. [2] Includes two-wheel, four-wheel, dollies, and platform trucks. [3] Includes pallets and skids.

Shipments of Paper Product Shipping Containers

Industry Div., Bureau of the Census

Class of Products	Value at Plant
Shipping Sacks	
Total—1947	$ 153,209,000
Total—1951	$ 251,303,000
Total—1952	$ 224,011,000
Total—1953	$ 241,931,000
Shipping Containers	
Total—1947	$ 833,858,000
Total—1951	$1,160,362,000
Total—1952	$1,068,745,000
Total—1953	$1,180,963,000
Folding Boxes and Cartons	
Total—1947	$ 401,447,000
Total—1951	$ 667,261,000
Total—1952	$ 626,153,000
Total—1953	$ 672,488,000
Set-up Boxes	
Total—1947	$ 210,671,000
Total—1951	$ 226,814,000
Total—1952	$ 224,086,000
Total—1953	$ 236,634,000
Total—Sacks, Containers, Boxes	
1947	$1,599,185,000
1951	$2,305,740,000
1952	$2,142,995,000
1953	$2,332,016,000

Shipments of Steel Shipping Containers

Industry Div., Bureau of the Census

	Barrels and Drums	Packages, Kegs and Pails
	1954	
Jan.	2,384,043	5,516,616
Feb.	2,496,433	5,277,354
Mar.	2,850,807	6,035,540
Apr.	2,818,772	6,192,941
May	2,780,533	5,771,726
June	3,046,675	6,358,531
July	2,734,220	6,255,044
Aug.	2,576,900	6,027,646
Sept.	2,728,324	5,987,587
Oct.	2,762,807	5,742,110
Nov.	2,679,105	5,120,832
Dec.	.....	.....
Total	29,858,619	64,285,927
	1953	
Jan.	2,667,360	4,988,480
Feb.	2,451,657	4,921,728
Mar.	2,838,068	5,579,692
Apr.	3,028,087	6,627,028
May	2,970,482	6,317,565
June	3,044,479	6,546,447
July	2,870,318	6,430,746
Aug.	2,780,798	5,737,678
Sept.	2,786,729	6,137,359
Oct.	2,964,237	6,161,262
Nov.	2,664,654	5,297,990
Dec.	2,828,392	5,141,377
Total	33,895,261	69,887,352
1952	34,246,252	64,068,727
1951	41,259,323	76,735,970
1950	36,778,806	69,157,839
1949	31,790,472	55,428,143

Value of Shipments of Excavating and Earthmoving Equipment

Industry Division, Bureau of the Census

Class of Product	1954	1953	1952	1951	1950
Power cranes and shovels	N.A.	$253,318,000	$199,821,000	$180,680,000	$109,006,000
Road construction and maintenance machinery	$118,970,000	119,674,000	160,068,000	151,779,000	117,540,000
Construction machinery for mounting on tractors	73,877,000	78,440,000	75,829,000	64,816,000	58,769,000
Tracklaying tractors	267,918,000	328,696,000	280,841,000	263,579,000	223,042,000
Wheel-type tractors (contractors off-highway type)	46,801,000	43,681,000	59,847,000	55,238,000	24,769,000
Trucks, truck tractors, and trailers, off-highway types	25,126,000	31,184,000	32,805,000	36,840,000	22,856,000
Portable well and blast hole drills	8,615,000	8,002,000	6,769,000	5,818,000	4,472,000
Other excavating and earth moving equipment	2,045,000	2,236,000	7,102,000	6,208,000	1,692,000
Total	$543,352,000	$865,331,000	$823,082,000	$764,958,000	$314,325,000

N.A.—Not available.

INDUSTRIAL TRUCK SPECIFICATIONS—1955-56

POWERED HIGH-LIFT FORK

Due to space limitations basic models only are presented for each of the companies represented. A multitude of

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (in.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	OVERALL DIMENSIONS: Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Length: Load Center (In.)	Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Overall—Including Carriage or Background
1	Atlas 3EA62	6000	27	5200*	St	Ptf	.....	Y	.....	.....	62	.....	27	104	54†	.....	3⅞	.....	.....	82†	.....	.....	.....	62†	.....	.....
2	Automatic FFE-10	1000	15	2560	St	Fk	Hyd	Y	10	5	35½	10⅝	24†	53⅝	36†	.....	4	2¾	55	68†	.....	107½	.....	107†	.....	120½
3	FFE-15	1500	15	3160	St	Fk	Hyd	Y	10	5	35½	10⅝	24†	53⅝	36†	.....	4	2¾	55	68†	.....	107½	.....	107†	.....	120½
4	FFE-20	2000	15	3920	St	Fk	Hyd	Y	10	5	35½	10⅝	24†	53⅝	36†	.....	4	2¾	55	68†	.....	107½	.....	107†	.....	120½
5	Shipper BF-15	1500	15	4395*	S	Fk	Hyd	Y	10	5	39	13¼	18†	58¼	30†	.....	5	3	58	68†	.....	118†	.....	108†	.....	144
6	BF-15	1500	15	4500*	S	Fk	Hyd	Y	10	5	39	13¼	18†	58¼	30†	.....	5	3	68	83†	.....	147†	.....	132†	.....	168
7	Shipper BF-20	2000	15	5180*	S	Fk	Hyd	Y	10	5	39	13½	24†	61¾	36†	.....	5	3	58	68†	.....	118†	.....	108†	.....	144
8	BF-20	2000	15	5669*	S	Fk	Hyd	Y	10	5	48	13½	24†	71	36†	.....	5	3	68	83†	.....	147†	.....	132†	.....	168
9	BF-30	3000	24	6388*	S	Fk	Hyd	Y	10	5	48	14	24†	74	36†	.....	5	3	68	83†	.....	147†	.....	132†	.....	168
10	BF-40	4000	24	7379*	S	Fk	Hyd	Y	10	5	48	14	24†	78	36†	.....	5	3	68	83†	.....	147†	.....	132†	.....	168
11	BF-40AE	4000	24	7250*	St	Fk	Hyd	Y	10	5	40	14	18†	82¾	36†	.....	5	3	68	83†	.....	147†	.....	132†	.....	168
12	CF-10	1000	15	4450*	S	Fk	Hyd	Y	10	3	42	12¼	24†	64⅞	36†	.....	4¼	2½	68	83†	.....	147†	.....	132†	.....	162
13	CF-15	1500	15	4450*	S	Fk	Hyd	Y	10	3	42	12¼	24†	64⅞	36†	.....	4¼	2½	68	83†	.....	147†	.....	132†	.....	162
14	CF-20	2000	15	4760*	S	Fk	Hyd	Y	10	3	42	12¼	24†	65¾	36†	.....	4¼	2½	68	83†	.....	147†	.....	132†	.....	162
15	CF-30	3000	24	5475*	S	Fk	Hyd	Y	10	3	42	12½	24†	69¼	36†	.....	4¼	2½	68	83†	.....	147†	.....	132†	.....	162
16	CF-40	4000	24	5490*	S	Fk	Hyd	Y	10	3	42	12½	15†	69¼	36†	.....	4¼	2½	68	83†	.....	147†	.....	132†	.....	162
17	CLA	800	15	1540	W	Fk	Hyd	N	10	5	35	5⅞	18†	49¾	36†	.....	2⅝	1½	69	83†	.....	83†	.....	69†	.....	93
18	CLB	1000	15	1570	W	Fk	Hyd	N	10	5	35	5⅞	18†	49¾	36†	.....	2⅝	1½	69	83†	.....	83†	.....	69†	.....	93
19	CLTA	650	15	1790	W	Fk	Hyd	Y	10	5	35	5⅞	18†	49¾	36†	.....	2⅝	1½	68½	83†	.....	150½†	.....	136†	.....	160
20	CLTB	810	15	1820	W	Fk	Hyd	Y	10	5	35	5⅞	18†	49¾	36†	.....	2⅝	1½	68½†	83†	.....	150½†	.....	136†	.....	160
21	ESRT-40	4000	24	.....	St	Fk	Hyd	Y	N	N	62	30¾	18†	74¾	36†	.....	2¼	1⅞	20	83†	.....	.....	146½	130†	.....	150½
22	ESST-20	2000	15	.....	St	Fk	Hyd	Y	N	N	50	.....	24†	.....	42†	.....	2¼	2½	67½	83†	.....	148†	.....	132½†	.....	.....
23	ESST-30	3000	24	.....	St	Fk	Hyd	Y	N	N	50	.....	24†	.....	42†	.....	2¼	2¼	66½	83†	.....	146½†	.....	130†	.....	.....
24	ESST-40	4000	24	.....	St	Fk	Hyd	Y	N	N	50	.....	24†	.....	42†	.....	2¼	2¼	66½	83†	.....	146½†	.....	130†	.....	.....
25	FF-10	1000	15	2474*	S	Fk	Hyd	Y	12½	2½	30	11½	24†	52¾	36†	.....	3⅜	3½	68	78†	.....	144†	.....	134†	.....	170
26	FF-15	1500	15	2871*	S	Fk	Hyd	Y	12½	2½	30	11½	15†	53¼	30†	.....	3⅜	3½	68	78†	.....	144†	.....	134†	.....	170
27	GLF-40	4000	24	7600	S	Fk	Hyd	Y	10	5	52	14¾	24†	79¾	36†	.....	5¼	3¼	69	83†	.....	143½	.....	130	.....	149
28	GLF-50	5000	24	8100	S	Fk	Hyd	Y	10	5	52	14¾	24†	82¾	36†	.....	5¼	3¼	69	83†	.....	143½	.....	130	.....	149
29	GLF-60	6000	24	8600	S	Fk	Hyd	Y	10	5	52	14¾	24†	85¼	42†	.....	5¼	3¼	69	83†	.....	143½	.....	130	.....	149
30	GLF-70	7000	24	.....	S	Fk	Hyd	Y	10	5	60	16½	24•	97¾	.....	42	.....	.....	24	83†	.....	136½	.....	.....	110	135
31	GLF-80	8000	24	.....	S	Fk	Hyd	Y	10	5	60	16½	24•	99¾	.....	42	.....	.....	24	83†	.....	136½	.....	.....	110	135
32	GLF-90	9000	24	.....	S	Fk	Hyd	Y	10	5	60	16¾	24•	101¾	.....	42	.....	.....	24	83†	.....	136½	.....	.....	110	135
33	GLF-100	10000	24	12200*	S	Fk	Hyd	Y	10	5	60	16¾	24†	103¾	42†	.....	.....	.....	24	83†	.....	136½	.....	110†	.....	135
34	HF-200	20000	36	31970*	St	Fk	Hyd	N	N	N	96	.....	42†	.....	.....	.....	6	6½	88†	127†	.....	127†	.....	88†	.....	.....
35	HF-250	25000	SA	.....	St	Fk	Hyd	N	N	N	96	.....	45†	.....	.....	.....	6	6½	88†	127†	.....	127†	.....	88†	.....	.....
36	HF-300	30000	SA	43500*	St	Fk	Hyd	N	N	N	96	.....	48†	.....	.....	.....	6	6½	88†	129†	.....	129†	.....	88†	.....	.....
37	HF-400	40000	SA	56400*	St	Fk	Hyd	N	N	N	108	.....	48†	.....	.....	.....	6	6½	72†	118†	.....	129†	.....	72†	.....	.....
38	HF-500	50000	SA	65500*	St	Fk	Hyd	N	N	N	108	.....	48†	.....	.....	.....	6	6½	61†	118†	.....	118†	.....	61†	.....	.....
39	HF-600	60000	SA	75800*	St	Fk	Hyd	N	N	N	110	.....	48†	.....	.....	.....	6	6½	61†	124†	.....	124†	.....	61†	.....	.....
40	HF-800	80000	SA	76000*	St	Fk	Hyd	N	N	N	110	.....	30†	.....	.....	.....	6	6½	61†	124†	.....	124†	.....	61†	.....	.....
41	LF-30	3000	24	7480*	St	Fk	Hyd	Y	10	5	55	14⅛	24†	78½	36†	.....	4½	3	64	83†	.....	143†	.....	124†	.....	160
42	LF-40	4000	24	8600*	St	Fk	Hyd	Y	10	5	55	14⅜	24†	82⅛	36†	.....	4¼	3	64	83†	.....	143†	.....	124†	.....	160
43	LF-50	5000	24	9330*	St	Fk	Hyd	Y	10	5	55	14⅜	24†	82⅛	36†	.....	4½	3	64	83†	.....	143†	.....	124†	.....	160
44	LF-60	6000	24	10200*	St	Fk	Hyd	Y	10	5	55	14⅜	24†	83⅝	42†	.....	4½	3	64	83†	.....	143†	.....	124†	.....	160
45	LF-70	7000	24	11200*	St	Fk	Hyd	Y	10	5	56	17⅝	24†	.....	42†	.....	5½	3	61	83†	.....	137†	.....	115†	.....	151
46	LF-80	8000	24	12075*	St	Fk	Hyd	Y	10	5	56	17⅝	24†	.....	42†	.....	5½	3	61	83†	.....	137†	.....	115†	.....	151
47	LF-90	9000	24	12400*	St	Fk	Hyd	Y	10	5	60	17⅞	24†	.....	42†	.....	5½	3	59	83†	.....	134†	.....	110†	.....	146
48	LF-100	10000	24	13400*	St	Fk	Hyd	Y	10	5	60	17⅞	24†	.....	42†	.....	5½	3	59	83†	.....	134†	.....	110†	.....	146
49	LFS-30	3000	24	7480*	S	Fk	Hyd	Y	10	5	53	.....	24†	.....	36†	.....	4½	3	64	83†	.....	143†	.....	124†	.....	160
50	LFS-40	4000	24	8600*	S	Fk	Hyd	Y	10	5	53	14⅜	24†	81⅛	36†	.....	4½	3	64	83†	.....	143†	.....	124†	.....	160
51	LFS-50	5000	24	9330*	S	Fk	Hyd	Y	10	5	53	14⅜	24†	82⅝	36†	.....	4½	3	64	83†	.....	143†	.....	124†	.....	160
52	LFS-60	6000	24	10200*	S	Fk	Hyd	Y	10	5	53	14⅜	24†	84⅛	42†	.....	4½	3	64	83†	.....	143†	.....	124†	.....	160
53	LFS-70	7000	24	11200*	S	Fk	Hyd	Y	10	5	55	17⅝	24†	90⅝	42†	.....	5½	3	61	83†	.....	137†	.....	115†	.....	151
54	LFS-80	8000	24	12075*	S	Fk	Hyd	Y	10	5	55	17⅝	24†	92⅛	42†	.....	5½	3	61	83†	.....	137†	.....	115†	.....	151
55	LFS-90	9000	24	12400*	S	Fk	Hyd	Y	10	5	60	17⅞	24†	93⅞	42†	.....	5½	3	59	83†	.....	134†	.....	110†	.....	146
56	LFS-100	10000	24	13400*	S	Fk	Hyd	Y	10	5	60	17⅞	24†	95⅛	42†	.....	5½	3	59	83†	.....	134†	.....	110†	.....	146
57	RTT	2000	15	4000*	S	Fk	Hyd	Y	10	5	39⅛	11⅝	24†	60¼	36†	.....	4½	2	68	83†	.....	147†	.....	132†	.....	168
58	SCL	2000	15	2780	W	Fk	Hyd	N	18	3	45	7	24†	64½	36†	.....	4	2	67	83†	.....	83†	.....	67†	.....	103
59	SCLH	2500	24	3260	W	Fk	Hyd	N	18	3	45	7½	24†	67¾	36†	.....	4	2	67	83†	.....	83†	.....	67†	.....	103
60	SCLT	2000	15	3015	W	Fk	Hyd	Y	18	3	45	7	24†	64½	36†	.....	4	2	67	83†	.....	83†	.....	131†	.....	167
61	SCLTH	2500	24	3495	W	Fk	Hyd	Y	18	3	45	7½	24†	67¾	36†	.....	4	2	67	83†	.....	83†	.....	67†	.....	103
62	SO	4000	24	2200	W	Ptf	Hyd	N	N	N	54	.....	18†	.....	36†	.....	1⅜	1⅜	66	83†	.....	83†	.....	66†	.....	102
63	SOT	4000	24	2600	W	Fk	Hyd	Y	N	N	60	.....	18†	.....	36†	.....	1⅜	1⅜	.....	83†	.....	.....	.....	128†	.....	164
64	SPH-4	4000	24	1900	W	Ptf	Hyd	N	N	N	55	.....	24†	.....	48†	.....	2⅝	2⅝	70	83†	.....	83†	.....	70†	.....	85
65	SPH-5	5000	24	2050	W	Ptf	Hyd	N	N	N	55	.....	24†	.....	48†	.....	2⅝	2⅝	70	83†	.....	83†	.....	70†	.....	85
66	SPL-4	4000	24	1800	W	Ptf	Hyd	N	N	N	55	.....	24†	.....	48†	.....	2⅛	2⅛	70	83†	.....	83†	.....	70†	.....	85
67	SPL-5	5000	24	1950	W	Ptf	Hyd	N	N	N	55	.....	24†	.....	48†	.....	2⅛	2⅛	70	83†	.....	83†	.....	70†	.....	85
68	SS	4000	24	2450	W	Fk	Hyd	N	N	N	54	.....	18†	.....	36†	.....	2	2	66	83†	.....	83†	.....	66†	.....	102
69	SST	4000	24	3000	W	Fk	Hyd	Y	N	N	60	.....	18†	.....	36†	.....	2	2	.....	83†	.....	.....	.....	128†	.....	164
70	THR-12	12000	36	17800*	St	Fk	Ch	N	10	3	68	19⅛	30†	112⅝	48†	.....	4¼	3¼	.....	83†	.....	83†	.....	49	.....	85
71	THR-14	14000	36	20650*	St	Fk	Ch	N	10	3	70	19⅛	36†	117⅛	48†	.....	4¼	3¼	.....	83†	.....	83†	.....	49	.....	85
72	THR-15	15000	36	21450*	St	Fk	Ch	N	10	3	70	19⅜	36†	117⅛	48†	.....	4¼	3¼	.....	83†	.....	83†	.....	49	.....	85
73	THR-16	16000	36	22900*	St	Fk	Ch	N	10	3	70	19⅜	39†	117⅛	48†	.....	4¼	3¼	.....	83†	.....	83†	.....	49	.....	85
74	THR-18	18000	36	24200*	St	Fk	Ch	N	N	N	70	19	39†	117	48†	.....	4¼	3¼	.....	83†	.....	83†	.....	49	.....	85
75	THTF-M-10	10000	24	16125*	St	Fk	Ch	Y	10	3	68	18½	24†	111¾	42†	.....	4	3	.....	83†	.....	.....	.....	98†	.....	134
76	TLN-2	4000	24	3650	St	Ptf	Ch	N	N	N	65	.....	30†	.....	.....	.....	4½	4½	60†	79½†	.....	79½	.....	60†	.....	79½
77	TLN-3	6000	24	4425	St	Ptf	Ch	N	N	N	65	.....	30†	.....	.....	.....	3¾	3¾	60†	81†	.....	81	.....	60†	.....	81
78	TLO-5	10000	24	6000	St	Ptf	Ch	N	N	N	78	.....	30†	.....	.....	.....	3	4¼	60†	83†	.....	83	.....	60†	.....	83

For Abbreviations and References see pages 96 and 97

INDUSTRIAL TRUCK SPECIFICATIONS—1955-56

OR PLATFORM TRUCKS

variations, to fit the needs of the individual user, are available from any of the manufacturers listed.

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
												Truck									
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Forward (mph)	Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for	Max. Drawbar Pull	Line Number
		61[A]		Own 1175	5	30	306	N	3	3	N	4.5	4.5	12	12	Y	20x6	10x6			1
55	2½	54	102	Auto-Lite	1½	24			3	3		4.5	4.5	50	FV	Y	16¼x6	10½x5	Opt		2
55	2½	54	102	Auto-Lite	1½	24			3	3		4.5	4.5	50	FV	Y	16¼x6	10½x5	Opt		3
55	2½	54	102	Auto-Lite	1½	24			3	3		4.5	4.5	50	FV	Y	16¼x6	10½x5	Opt		4
56[A]	2½[A]	54[A]	100[A]	Own		24		N	4	4	N	5.0	5.0	20	FV	Y	20x5	10x5	Opt		5
56[A]	2½[A]	54[A]	100[A]	Own		32		N	4	4	N	5.0	5.0	15	FV	Y	20x5	10x5	Opt		6
57[A]	2½[A]	57[A]	107[A]	Own		24		N	4	4	N	5.0	5.0	19	FV	Y	20x5	10x5	Opt		7
67[A]	6[A]	60[A]	117[A]	Own		32		N	4	4	N	6.0	6.0	30	FV	Y	20x5	15x5	Opt		8
69[A]	5[A]	61[A]	119[A]	Own		32		N	4	4	N	4.6	4.6	26	FV	Y	20x6	15x5	Opt		9
71[A]	4[A]	64[A]	121[A]	Own		32		N	4	4	N	5.5	5.5	22	FV	Y	20x7	15x5	Opt		10
72[A]	2½[A]	66[A]	122[A]	Own		30		N	3	3	N	5.2	5.2	18	FV	Y	20x7	15x5	Opt		11
82[A]	0[A]	58[A]	110[A]	Own		32		N	4	4	N	6.4	6.4	37	45	Y	17x5	12x3½	Opt		12
82[A]	0[A]	58[A]	110[A]	Own		32		N	4	4	N	6.4	6.4	36	45	Y	17x5	12x3½	Opt		13
82[A]	0[A]	58[A]	110[A]	Own		32		N	4	4	N	6.3	6.3	35	45	Y	17x5	12x3½	Opt		14
65[A]	0[A]	62[A]	114[A]	Own		32		N	4	4	N	5.6	5.6	33	45	Y	17x6	12x4½	Opt		15
65[A]	0[A]	62[A]	114[A]	Own		32		N	4	4	N	5.3	5.3	27	45	Y	17x7	12x4½	Opt		16
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		17
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		18
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		19
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	9x5	N		20
			78[V]	Auto-Lite	1½	12			3	3					FV	Y	10x4	6½x4¾	N		21
				Auto-Lite	1½	12		N	3	3	N				FV	Y	10x4	4¾x2¾	N		22
				Auto-Lite	1½	12		N	3	3	N				FV	Y	10x4	4¾x2¾	N		23
				Auto-Lite	1½	12		N	3	3	N				FV	Y	10x4	4¾x2¾	N		24
50[A]	0[A]	52[A]	91½[A]	Auto-Lite	1½	24		N	3	3	N	5.8	5.8	35	FV	Y	17x6	16x3½	Opt		25
50[A]	0[A]	52[A]	91½[A]	Auto-Lite	1½	24		N	3	3	N	5.5	5.5	30	FV	Y	17x6	16x4	Opt		26
75[A]	0[A]	67[A]	126[A]	Cont F-162	38			Ele	Inf	Inf	N	8.0	8.0	40	60	N	22x7	16¼x5	Opt		27
78[A]	0[A]	69[A]	129[A]	Cont F-162	38			Ele	Inf	Inf	N	8.0	8.0	40	60	N	22x8	16¼x6	Opt		28
80[A]	0[A]	73[A]	137[A]	Cont F-162	38			Ele	Inf	Inf	N	8.0	8.0	40	60	N	22x9	16¼x7	Opt		29
				Cont F-162	38			Ele	Inf	Inf	N				FV	N	22x10	16¼x7	Opt		30
				Cont F-162	38			Ele	Inf	Inf	N				FV	N	22x10	16¼x7	Opt		31
				Cont F-162	38			Ele	Inf	Inf	N				FV	N	22x12	16¼x7	Opt		32
93[A]		82[A]	151[A]	Cont F-162	38			Ele	Inf	Inf	N				FV	N	22x12	16¼x7	Opt		33
				Own		(1)		N	3	3	N				FV	Y	36x12	20x8			34
				Own		(1)		N	3	3	N				FV	Y	36x14	20x8			35
				Own		(1)		N	3	3	N				FV	Y	36x16	20x9			36
				Own		(1)		N	3	3	N				FV	Y	36x18	20x10			37
				Own		(1)		N	3	3	N				FV	Y	36x20	22x10			38
				Own		(1)		N	3	3	N				FV	Y	36x24	22x12	N		39
				Own		(1)		N	3	3	N				FV	Y	(2)	22x14	N		40
77[A]	6[A]	67[A]	128[A]	Own		30		N	3	3	N	5.0	5.0	18	FV	Y	20x6	15x5	Opt		41
80[A]	5[A]	71[A]	131[A]	Own		36		N	3	3	N	6.0	6.0	20	FV	Y	20x7	15x5	Opt		42
80[A]	4[A]	71[A]	131[A]	Own		36		N	3	3	N	5.8	5.8	19	FV	Y	20x8	15x7	Opt		43
81[A]	3[A]	74[A]	138[A]	Own		36		N	3	3	N	5.7	5.7	18	FV	Y	20x9	15x7	Opt		44
				Own		48		N	4	4	N	5.4	5.4	18	FV	Y	22x10	15x8	Opt		45
				Own		48		N	4	4	N	5.3	5.3	17	FV	Y	22x10	15x8	Opt		46
				Own		48		N	4	4	N	4.9	4.9	15	FV	Y	22x12	15x8	Opt		47
				Own		48		N	4	4	N	4.7	4.7	13	FV	Y	22x12	15x8	Opt		48
				Own				N	4	4	N				FV			15x5	Opt		49
80[A]	5[A]	71[A]	131[A]	Own		36		N	4	4	N	6.0	6.0	20	FV	Y	20x7	15x5	Opt		50
81[A]	4[A]	72[A]	132[A]	Own		36		N	4	4	N	5.8	5.8	19	FV	Y	20x8	15x7	Opt		51
81[A]	3[A]	74[A]	138[A]	Own		36		N	4	4	N	5.7	5.7	18	FV	Y	20x9	15x7	Opt		52
85[A]	2[A]	79[A]	145[A]	Own		48		N	4	4	N	5.4	5.4	18	FV	Y	22x10	15x8	Opt		53
85[A]	2[A]	79[A]	145[A]	Own		48		N	4	4	N	5.3	5.3	17	FV	Y	22x10	15x8	Opt		54
88[A]	2[A]	80[A]	148[A]	Own		48		N	4	4	N	4.9	4.9	15	FV	Y	22x12	15x8	Opt		55
88[A]	2[A]	80[A]	148[A]	Own		48		N	4	4	N	4.7	4.7	13	FV	Y	22x12	15x8	Opt		56
60½[A]	3[A]	57[A]	108[A]	Auto-Lite	1½	24		N	3	3	N	4.3	4.3	12	FV	Y	15x6	10x6	Opt		57
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x6	N		58
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x7	N		59
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x6	N		60
				Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x7	N		61
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x5	3½x2¾	N		62
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	3½x2¾	N		63
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x5	10x4½	N		64
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x6	10x4½	N		65
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x5	5½x4½	N		66
	0			Auto-Lite	1½	12		N	2	2	N					Y	10x6	5½x4½	N		67
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	5x3½	N		68
				Auto-Lite	1½	12		N	2	2	N					Y	10x5	5x3½	N		69
108[A]	5[A]	94[A]	176[A]	Own		48		N	3	3	N	5.0	5.0	14	AB	Y	22x12	15x9	Opt		70
118[A]	10[A]	97[A]	184[A]	Own		(3)		N	3	3	N	4.6	4.6	10-13	AB	Y	22x14	15x7	Opt		71
118[A]	10[A]	97[A]	184[A]	Own		(3)		N	3	3	N	4.5	4.5	9-12	AB	Y	22x14	15x7	Opt		72
118[A]	8[A]	98[A]	184[A]	Own		(3)		N	3	3	N	4.4	4.4	8-11	AB	Y	22x16	15x8	Opt		73
116[A]	8[A]	98[A]	184[A]	Own		(3)		N	3	3	N	4.2	4.2	6-9	AB	Y	22x16	15x8	Opt		74
108[A]	2[A]	92[A]	169[A]	Own		48		N	3	3	N	5.2	5.2	11-12	35[●]	Y	22x12	15x9	Opt		75
97[A]	46[A]	61[A]		Own		30		N	4	4	N	5.2	5.2	11	DB	Y	22x4½	9x5	N		76
99[A]	46[A]	62[A]		Own		(4)		N	4	4	N	4.2	4.2	14	DB	Y	20x6	10x6	N		77
118[A]	62[A]	69[A]		Own		(4)		N	3	3	N	4.9	4.9	8-10	DB	Y	20x7	10x6	N		78

For Abbreviations and References see pages 96 and 97

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED HIGH-LIFT FORK

Line Number	Make and Model	Maximum Capacity: Load (lb.)	Maximum Capacity: Load Center (In.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	Mast: Telescopic	Mast: Tilt: Rearward (Deg.)	Mast: Tilt: Forward (Deg.)	Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	Overall Dimensions: Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Height: Overall—Including Carriage or Backguard	Turning With — Outside (Tailswing)	Turning With — Inside
1	Baker FL-10	1000	24	2650	S	Fk	Hyd	Y	10	3	36½	10¾	24*	60½	....	36	4¼	2½	60	69	83	87	150	104	132	154	59	39
2	FLE-10	1000	24	2650	S	Fk	Hyd	Y	10	3	36½	10¾	24*	60½	....	36	4¼	2½	5	69	83	87	148	78	130	152	59	39
3	FL-15	1500	24	2750	S	Fk	Hyd	Y	10	3	36½	10¾	24*	60½	....	36	4¼	2½	60	69	83	87	150	104	132	154	59	39
4	FLE-15	1500	24	2750	S	Fk	Hyd	Y	10	3	36½	10¾	24*	60½	....	36	4¼	2½	5	69	83	87	148	78	130	152	59	39
5	FP-15	1500	24	2750	St	Fk	Hyd	Y	10	3	47	10¾	24*	66	....	36	4	2½	60	59	83	77	150	71	132	154	60½	39
6	FPE-15	1500	24	2750	St	Fk	Hyd	Y	10	3	47	10¾	24*	66	....	36	4	2½	5	59	83	77	148	71	130	152	60½	39
7	FS-20	2000	24	3400	S	Fk	Hyd	Y	10	3	38	14½	24*	69	....	36	4¼	2½	66	69	83	87	150	104	132	154	65	45
8	FSE-20	2000	24	3400	S	Fk	Hyd	Y	10	3	38	14½	24*	69	....	36	4¼	2½	5	69	83	87	148	78	130	152	65	45
9	FS-25	2500	24	4050	S	Fk	Hyd	Y	10	3	38	15	24*	71	....	36	4¼	2½	5	69	83	87	150	104	132	154	66	46
10	FSE-25	2500	24	4050	S	Fk	Hyd	Y	10	3	38	15	24*	71	....	36	4¼	2½	66	69	83	87	148	78	130	152	66	46
11	FT-30-S	3000	24	5000	S	Fk	Hyd	Y	10	3	40	16¾	24*	70½	....	36	5	2½	58½	69	83	121	149	102	130	153	68	48
12	FTE-30-S	3000	24	5000	S	Fk	Hyd	Y	10	3	40	16¾	24*	70½	....	36	5	2½	5	69	83	97	149	78	130	153	68	48
13	FT-30	3000	24	5100	S	Fk	Hyd	Y	10	3	43	16¾	24*	75	....	36	5	2½	58½	69	83	121	149	102	130	153	71½	48
14	FTE-30	3000	24	5100	S	Fk	Hyd	Y	10	3	43	16¾	24*	75	....	36	5	2½	5	69	83	121	149	78	130	153	71½	48
15	FC-30	3000	24	4900	St	Fk	Hyd	Y	10	3	43	16¾	24*	77¾	....	36	5	2½	58½	69	83	121	149	78	102	153	73	48
16	FCE-30	3000	24	4900	St	Fk	Hyd	Y	10	3	43	16¾	24*	77¾	....	36	5	2½	5	69	83	121	149	78	130	153	73	48
17	FT-40	4000	24	5650	S	Fk	Hyd	Y	10	3	43	16¾	24*	79	....	36	5	2½	58½	69	83	121	149	102	130	153	74	48
18	FTE-40	4000	24	5650	S	Fk	Hyd	Y	10	3	43	16¾	24*	79	....	36	5	2½	5	69	83	121	149	78	130	153	74	48
19	FC-40	4000	24	5400	St	Fk	Hyd	Y	10	3	43	16¾	24*	79¼	....	36	5	2½	58½	69	83	121	149	102	130	153	74	48
20	FCE-40	4000	24	5400	St	Fk	Hyd	Y	10	3	43	16¾	24*	79¼	....	36	5	2½	5	69	83	121	149	78	130	153	74	48
21	FD-40	4000	24	7500	S	Fk	Hyd	Y	10	3	43	....	24*	83	....	36	5	2½	58½	69	83	121	149	102	130	153	78	48
22	FDE-40	4000	24	7500	S	Fk	Hyd	Y	10	3	43	....	24*	83	....	36	5	2½	5	69	83	121	149	78	130	153	78	48
23	FT-40	5000	24	7400	S	Fk	Hyd	Y	10	3	48	....	24*	89¾	....	42	5	2½	58½	69	83	118	139	99	120	143	80	50
24	FTE-50	5000	24	7400	S	Fk	Hyd	Y	10	3	48	....	24*	89¾	....	42	5	2½	11	69	83	111	139	92	120	143	80	50
25	FC-50	5000	24	7400	St	Fk	Hyd	Y	10	3	48	....	24*	92¼	....	42	5	2½	58½	69	83	118	139	99	120	143	81	50
26	FCE-50	5000	24	7500	St	Fk	Hyd	Y	10	3	48	19	24*	89¾	....	42	5	2½	11	69	83	111	139	92	120	143	81	50
27	FT-60	6000	24	8000	S	Fk	Hyd	Y	10	3	48	19	24*	91	....	42	5	2½	58½	69	83	118	139	99	120	143	81	50
28	FTE-60	6000	24	8000	S	Fk	Hyd	Y	10	3	48	19	24*	91	....	42	5	2½	11	69	83	111	139	92	120	143	81	50
29	FC-60	6000	24	8000	St	Fk	Hyd	Y	10	3	48	19	24*	91	....	42	5	2½	58½	69	83	118	139	99	120	143	81	50
30	FCE-60	6000	24	8000	St	Fk	Hyd	Y	10	3	48	19	24*	91	....	42	5	2½	11	69	83	111	139	92	120	143	81	50
31	JOM-70	7000	24	8400	St	Fk	Hyd	N	12	5	60	17	24*	97	....	42	5	2½	47	....	83	....	83	....	65	101	99	2
32	JOMH-70	7000	24	8700	St	Fk	Hyd	Y	12	5	60	17	24*	97	....	42	5	2½	19½	....	83	....	127	....	119	155	99	2
33	JOM-70/60	7000	24	9000	St	Fk	Hyd	N	12	5	60	17	30*	97	....	42	5	2½	47	....	83	....	83	....	65	101	99	2
34	JOMH-70/60	7000	24	9300	St	Fk	Hyd	Y	12	5	60	17	30*	97	....	42	5	2½	19½	....	83	....	127	....	119	155	99	2
35	JOM-80	8000	24	9600	St	Fk	Hyd	N	12	5	66	19⅝	24*	105⅝	....	42	5	2½	47	....	83	....	83	....	60	96	105	2
36	JOMH-80	8000	24	9900	St	Fk	Hyd	Y	12	5	66	19⅝	24*	105⅝	....	42	5	2½	29½	....	83	....	117	....	109	145	105	2
37	JOM-100	10000	24	10500	St	Fk	Hyd	N	12	5	72	19⅝	24*	111⅝	....	42	5	2½	47	....	83	....	83	....	60	96	114	2
38	JOMH-100	10000	24	10800	St	Fk	Hyd	Y	12	5	72	19⅝	24*	111⅝	....	42	5	2½	29½	....	83	....	117	....	109	145	114	2
39	H5	10000	24	5450	St	Ptf	Hyd	N	....	....	67	....	....	81½	60	84	3⅜	3⅜	60	88	....	88	....	....	63½	91	116½	2
40	HH5	10000	24	5700	St	Ptf	Hyd	Y	....	....	67	....	....	81½	60	84	3⅜	3⅜	N	88	....	132½	....	....	108	135½	116½	2
41	FG-30	3000	24	6100*	S	Fk	Hyd	Y	10	3	48	13⅛	24*	75¾	36		5	3	5	69	83	120¾	148	102	130	153¼	73¼	48
42	FG-40	4000	24	6800*	S	Fk	Hyd	Y	10	3	48	15⅛	24*	80	36		5	3	5	69	83	120¾	148	102	130	153¼	75	48
43	FG-60	6000	24	8700*	S	Fk	Hyd	Y	10	5	54	15⅞	24*	93⅜	36		5⅝	3	12	69	83	112	140	92	120	132	85½	48
44	FD-50	5000	24	7800*	S	Fk	Hyd	Y	10	3	54	18¾	24*	95½	36		5	3	12	69	83	112	140	92	120	131	87½	48
45	FD-60	6000	24	9600*	S	Fk	Hyd	Y	10	3	54	18¾	24*	98	36		5	3	12	69	83	112	140	92	120	131	90½	48
46	EY-40	4000	24	6400*	S	Fk	HC	Y	10	5	55	20	18*	100½	36		9½	5	N	68	82	108	142	94	122	147½	90	48
47	60N	6000	24	13750*							100		24◇		48						97				120		295	
48	Barrett NTF-20-60	2000	24	3535	W	Fk	HE	N	N	N	32	9½	24	58¼	30	48	3½	2	60	83	....	83	....	60	....	83¼	78	48
49	NTF-20-45	2000	24	3285	W	Fk	HE	N	N	N	32	9½	24	58¼	30	48	3½	2	45	68	....	68	....	45	....	68¼	78	48
50	TTF-20-S-60	2000	24	3620	W	Fk	HE	N	10	2	32	9½	24	58¼	30	48	3½	2	60	83	....	83	....	60	....	83¼	78	48
51	TTF-2-S-45	2000	24	3370	W	Fk	HE	N	10	2	32	9½	24	58¼	30	48	3½	2	45	68	....	68	....	45	....	68¼	78	48
52	TTF-20-T-90	2000	24	3630	W	Fk	HE	Y	10	2	32	9½	24	58¼	30	48	3½	2	45	68	....	113	....	90	....	113¼	78	48
53	TTF-20-T-120	2000	24	3880	W	Fk	HE	Y	10	2	32	9½	24	58¼	30	48	3½	2	60	83	....	143	....	120	....	143¼	78	48
54	Buda FB20-15	2000	15	3489	S	Fk	Hyd	Y	10	5	38	11½	15	62¾	30		7	3	24*	50	113	64½	190½	42	168	62¾	70	39
55	FPB20-15	2000	15	3489	S	Fk	Hyd	Y	10	5	38	13¼	15	66⅞	30		8¼	3	24*	50	113	64½	190½	42	168	66⅞	70	39
56	FB20-24	2000	15	4104	S	Fk	Hyd	Y	10	5	38	11½	24	62¾	30		7	3	24*	50	113	64½	190½	42	168	62¾	72	39
57	FPB20-24	2000	15	4104	S	Fk	Hyd	Y	10	5	38	13¼	24	66⅞	30		8¼	3	24*	50	113	64½	190½	42	168	66⅞	72	39
58	FT30-15	3000	24	4880	S	Fk	Hyd	Y	10	5	40	12	15	74⅜	30		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	70	48
59	FTD30-15	3000	24	4970	S	Fk	Hyd	Y	10	5	40	12	15	74⅜	30		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	70	48
60	FT30-24	3000	24	5768	S	Fk	Hyd	Y	10	5	40	12	24	76¼	36		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	72	48
61	FTD30-24	3000	24	5858	S	Fk	Hyd	Y	10	5	40	12	24	76¼	36		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	72	48
62	FT40-18	4000	24	5948	S	Fk	Hyd	Y	10	5	40	12	18	76¼	36		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	72	48
63	FTD40-18	4000	24	6038	S	Fk	Hyd	Y	10	5	40	12	18	76¼	36		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	72	48
64	FT40-24	4000	24	6278	S	Fk	Hyd	Y	10	5	45	12	24	81¼	36		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	77½	48
65	FTD40-24	4000	24	6368	S	Fk	Hyd	Y	10	5	45	12	24	81¼	36		5¼	3	24*	50	113	68⅜	194⅜	42	168	....	77½	48
66	FTP40-24	4000	24	7210	S	Fk	Hyd	Y	10	5	49	17½	24	91	36		8	3	24	50	113	68⅜	194⅜	42	168	....	86	48
67	FTPD40-24	4000	24	7300	S	Fk	Hyd	Y	10	5	49	17½	24	91	36		8	3	24	50	113	68⅜	194⅜	42	168	....	86	48
68	FTB50-24	5000	24	7185	S	Fk	Hyd	Y	10	5	45	12⅛	24	84	36		5¼	3	24	50	113	68⅜	194⅜	42	168	194¼	79½	48
69	FTBD50-24	5000	24	7275	S	Fk	Hyd	Y	10	5	45	12⅛	24	84	36		5¼	3	24	50	113	68⅜	194⅜	42	168	194¼	79½	48
70	FT50-24	5000	24	7704	S	Fk	Hyd	Y	10	5	50	14⅛	24	88	36		6¼	....	16½•	50	113	74½	200½	42	168	....	82½	48
71	FTD50-24	5000	24	7824	S	Fk	Hyd	Y	10	5	50	14⅛	24	88	36		6¼	....	16½•	50	113	74½	200½	42	168	....	82½	48
72	FT60-24	6000	24	8847	S	Fk	Hyd	Y	10	5	55	14¼	24	93	42		6¼	....	16½•	50	113	74½	200½	42	168	....	88	48
73	FTD60-24	6000	24	9997	S	Fk	Hyd	Y	10	5	55	14¼	24	93	42		6¼	....	16½•	50	113	74½	200½	42	168	....	88	48
74	Dual FTP60-24	6000	24	9250	S	Fk	Hyd	Y	10	5	65	20	24	104¾	42		9	....	16½•	50	113	74¾	200¾	42	168	....	96	48
75	Dual FTPD60-24	6000	24	9400	S	Fk	Hyd	Y	10	5	65	20	24	104¾	42		9	....	16½•	50	113	74¾	200¾	42	168	....	96	48
76	FT75-24	7500	24	9531	S	Fk	Hyd	Y	10	5	60	14¾	24	100½	42		6¼	....	8½•	50	113	74¾	200¾	42	168	....	111	48
77	FTD75-24	7500	24	9681	S	Fk	Hyd	Y	10	5	60	14¾	24	100½	42		6¼	....	8½•	50	113	74¾	200¾	42	168	....	111	48
78	Champ 300	4000	24	8180	S	Fk	HC	Y	12	6	67	21	36*	108	42	48	15	9	N	139	140	236	237	66	192	236	156	1
79	600	6000	24	9980	S	Fk	HC	Y	12	6	73	24	36*	137	42	72	15	9	N	161	162	281½	282	168	240	280	192	1
80	700	6000	24	10200	S	Fk	HC	Y	12	6	73	24	36*	137	42	72	15	9	N	161	162	281½	282	168	240	280	192	1
81	Clark ETR-1024	1000	24	1615	S	Fk	Hyd	Y	10	3	30½	10⅝	36*	53½	30†		5	2¾	6¼	56	84	93	149	74	130	....	58	36
82	ECE-2024	2000	24	3650	S	Fk	Hyd	Y	10	3	37	12¾	40*	63½	30†		3½	2⅝	6½	57	87	90½	150½	72	132	....	82	36
83	ECL-3024	4000	15	5040	S	Fk	Hyd	Y	10	3	44	14¾	40*	74¾	36†		4¼	2⅝	6½	59	102	93½	177½	72	156	....	89	36
84	ECL-4024	4000	24	5880	S	Fk	Hyd	Y	10	3	48	14¾	40*	77¼	36†		4½	2½	6½	59	102	93½	177½	72	156	....	78	36
85	ECL-5024	5000	24	6833	S	Fk	Hyd	Y	10	3	48	14¾	40*	79¼	36†		4½	2½	6½	59	102	93½	177½	72	156	....	78	36
86	EUT-6024	7000	18	8073	S	Fk	Hyd	Y	10	3	54	15½	45*	87	42†		4½	2¾	25	60	117	95½	203½	72	180	....	84	36
87	EUT-7024	7000	24	9653	S	Fk	Hyd	Y	10	3	54	15½	45*	89	42†		4¼	2¾	25	60	117	95½	203½	72	180	....	98	36
88	ETR-1024	1000	24	2605	S	Fk	Hyd	Y	10	3	30½	12½	36*	55⅛	30†		5⅝	2¾	60¾	65	78½	120¾	147¾	103	130	....	57	36

For Abbreviations and References see pages 96 and 97

OR PLATFORM TRUCKS—*continued*

Overall—Including Carriage or Backguard	TURNING RADIUS (In.) With 40"x48" Pallet: Outside (Tailswing)	TURNING RADIUS (In.) With 40"x48" Pallet: Inside	TURNING RADIUS (In.) With 40"x48" Pallet: Intersecting Aisle Width	TURNING RADIUS (In.) With 40"x48" Pallet: Minimum Aisle for Right Angle Stacking	ENGINE OR MOTOR: Make and Model	ENGINE OR MOTOR: Horsepower	BATTERY: Normal Voltage	BATTERY: Ampere Hours	TRANSMISSION: Conventional or Automatic	TRANSMISSION: No. of Forward Speeds	TRANSMISSION: No. of Reverse Speeds	Clutch Type	SPEEDS With Capacity Load: Truck: Forward (mph)	SPEEDS With Capacity Load: Truck: Reverse (mph)	SPEEDS With Capacity Load: Holisting (fpm)	SPEEDS With Capacity Load: Lowering (fpm)	Dead Man Brake	TIRE SIZES: Drive Wheels	TIRE SIZES: Steering Wheels	TOWING: Provision for—	TOWING: Max. Drawbar Pull	Line Number
154		4	60	110	Own 1653	4½	(5)	300		3	3		5.7	5.7	44	45	Y	15x3½	10x4	N		1
152		4	50	110	Own 1653	4½	(5)	300		3	3		5.7	5.7	44	45	Y	15x3½	10x4	N		2
154		4	60	110	Own 1653	4½	(5)	300		3	3		5.5	5.5	40	45	Y	15x3½	10x4	N		3
152		4	60	110	Own 1653	4½	(5)	300		3	3		5.5	5.5	40	45	Y	15x3½	10x4	N		4
154		4	61	111	Own 1653	4½	(5)	300		3	3		5.5	5.5	40	45	Y	15x3½	8½x4	N		5
152		4	61	111	Own 1653	4½	(5)	300		3	3		5.5	5.5	40	45	Y	15x3½	8½x4	N		6
154		5	73	120	Own 1653	4½	(4)	(6)		5	5		5.5	5.5	27	38	Y	17¾x5	10½x5	N		7
152		5	73	120	Own 1653	4½	(4)	(6)		5	5		5.5	5.5	25	38	Y	17¾x5	10½x5	N		8
154		5	74	121	Own 1653	4½	(4)	(6)		5	5		5.5	5.5	25	37	Y	17¾x6	10½x5	N		9
152		5	74	121	Own 1653	4½	(4)	(6)		5	5		5.5	5.5	25	37	Y	17¾x6	10½x5	N		10
153		5	70	126	Own 1860	7	(4)	400		5	5		5.7	5.7	30	40	Y	22x6	16¼x5	N		11
153		5	70	126	Own 1860	7	(4)	400		5	5		5.7	5.7	30	40	Y	22x6	16¼x5	N		12
153		5	72	128	Own 1860	7	(4)	400		5	5		5.7	5.7	30	40	Y	22x6	16¼x5	N		13
153		5	72	128	Own 1860	7	(4)	400		5	5		5.7	5.7	30	40	Y	22x6	16¼x5	N		14
153		5	72	130	Own 1860	7	(4)	400		5	5		5.7	5.7	30	40	Y	22x6	16¼x5	N		15
153		5	72	130	Own 1860	7	(4)	400		5	5		5.7	5.7	30	40	Y	22x6	16¼x5	N		16
153		6	74	131	Own 1860	7	(4)	450		5	5		5.3	5.3	28	40	Y	22x7	16¼x5	N		17
153		6	74	131	Own 1860	7	(4)	450		5	5		5.3	5.3	28	40	Y	22x7	16¼x5	N		18
153		6	74	131	Own 1860	7	(4)	450		5	5		5.3	5.3	28	40	Y	22x7	16¼x5	N		19
153		6	74	131	Own 1860	7	(4)	450		5	5		5.3	5.3	28	40	Y	22x7	16¼x5	N		20
153		8	76	134	(7)	(8)			Ele	5	5		8.0	8.0	28	40	Y	22x7	16¼x5	N		21
153		8	76	134	(7)	(8)			Ele	5	5		8.0	8.0	28	40	Y	22x7	16¼x5	N		22
143		8	74	138	Own 1860	7	(4)	500		5	5		5.0	5.0	20	40	Y	22x8	15x6	N		23
143		8	74	138	Own 1860	7	(4)	500		5	5		5.0	5.0	20	40	Y	22x8	15x6	N		24
143		8	75	141	Own 1860	7	(4)	500		5	5		5.0	5.0	20	40	Y	22x8	15x6	N		25
143		8	75	141	Own 1860	7	(4)	500		5	5				20	40	Y	22x8	15x6	N		26
143		8	77	141	Own 1860	7	(4)	550		5	5		5.0	5.0	17	35	Y	22x8	15x6	N		27
143		8	77	141	Own 1860	7	(4)	550		5	5		5.0	5.0	17	35	Y	22x8	15x6	N		28
143		8	77	141	Own 1860	7	(4)	550		5	5		5.0	5.0	17	35	Y	22x8	15x6	N		29
143		8	77	141	Own 1860	7	(4)	550		5	5		5.0	5.0	17	35	Y	22x8	15x6	N		30
101		20	80	156	Own 2460	8	(9)	600		5	5		5.7	5.7	33	35	Y	22x10	15x8	N		31
155		20	80	156	Own 2460	8	(9)	600		5	5		5.7	5.7	33	35	Y	22x10	15x8	N		32
101		20	80	156	Own 2480	8	(9)	600		5	5		5.7	5.7	33	35	Y	22x10	15x8	N		33
155		20	80	156	Own 2460	9	(9)	600		5	5		5.7	5.7	33	35	Y	22x10	15x8	N		34
96		22	85	165	Own 2460	8	(9)	660		5	5		5.2	5.2	31	35	Y	22x12	15x8	N		35
145		22	85	165	Own 2460	8	(9)	660		5	5		5.2	5.2	31	35	Y	22x12	15x8	N		36
96		24	92	174	Own 2460	8	48	660		5	5		5.2	5.2	20	35	Y	22x12	15x8	N		37
145		24	92	174	Own 2460	8	48	660		5	5		5.2	5.2	20	35	Y	22x12	15x8	N		38
91		56	75	177	Own 2460	8	36	500		5	5		4.2	4.2	20	60	Y	20x6	4x10x6	N		39
135½		56	75	177	Own 2460	8	36	500		5	5		4.2	4.2	20	60	Y	20x6	4x10x6	N		40
153¼	73¼	5½	68½	127	Her IXLB	37	6	115	Conv	2	2	Fr	8.0	8.0	40	40	Y	17¾x6	14x4½	Y	2600	41
153¼	75	5½	68½	128	Her IXLB	37	6	115	Conv	2	2	Fr	8.0	8.0	40	40	Y	18x7	14x4½	Y	2600	42
132	85½	3	75	142	Her QXB	62	6	115	Conv	2	2	Fr	8.0	8.0	35	100	Y	22x8	16¼x6	Y	2600	43
131	87½	10	75½	147	Her JX4D	57	6	115	Aut	Inf	Inf	Ele	8.0	8.0	35	100	Y	22x8	16¼x6	Y	2600	44
131	90½	10	77½	150	Her JX4D	57	6	115	Aut	Inf	Inf	Ele	8.0	8.0	35	100	Y	22x8	16¼x6	Y	2600	45
147½	90	13	82	150	JIC VTA1353	27	6	100	Conv	4	1	Fr	7.4	3.3	24	42	N	7.50/16	6.00/9	N		46
	295		158																			47
83¼	78	14	70	110½	Own	1	12	(10)		2	2		2.0	2.0	10	15	Y	10x5	10x6	N		48
68¼	78	14	70	110½	Own	1	12	(10)		2	2		2.0	2.0	10	15	Y	10x5	10x6	N		49
83¼	78	14	70	110½	Own	1	12	(10)		2	2		2.0	2.0	10	15	Y	10x5	10x6	N		50
68¼	78	14	70	110½	Own	1	12	(10)		2	2		2.0	2.0	10	15	Y	10x5	10x6	N		51
113¼	78	14	70	110½	Own	1	12	(10)		2	2		2.0	2.0	10	15	Y	10x5	10x6	N		52
143¼	78	14	70	110½	Own	1	12	(10)		2	2		2.0	2.0	10	15	Y	10x5	10x6	N		53
	623/4	10¼	53¾	122¼	Wau ICK-135-B	18			Conv	2	2	Fr	5.8	5.8	44		N	17x5x12½	14x4x10	Y		54
	69⅝	16¼	56¼	130⅝	Wau ICK-135-B	18			Conv	2	2	Fr	7.0	7.0	44		N	6.00/9	5.00/8	Y		55
	623/4	10¼	53¾	122¼	Wau ICK-135-B	18			Conv	2	2	Fr	5.8	5.9	44		N	17x5x12½	14x4x10	Y		56
	69⅝	16¼	56¼	130⅝	Wau ICK-135-B	18			Conv	2	2	Fr	7.0	7.0	44		N	6.00/9	5.00/8	Y		57
	70	7	60½	82▲	Buda 4BD-153	49			Conv	2	2	Fr	6.6	6.6	45		N	17x6x12½	15x4x11¼	Y		58
	70	7	60½	82▲	Buda 4BD-153	40½			Conv	2	2	Fr	6.6	6.6	45		N	17x6x12½	15x4x11¼	Y		59
	72	7	63½	84▲	Buda 4B-153	49			Conv	2	2	Fr	6.6	6.6	45		N	17x6x12½	15x4x11¼	Y		60
	72	7	63½	84▲	Buda 4BD-153	40½			Conv	2	2	Fr	6.6	6.6	45		N	17x6x12½	15x4x11¼	Y		61
	72	7	63½	84▲	Buda 4B-153	49			Conv	2	2	Fr	6.6	6.6	45		N	17x7x12½	15x5x11¼	Y		62
	72	7	63½	84▲	Buda 4BD-153	40½			Conv	2	2	Fr	6.6	6.6	45		N	17x7x12½	15x5x11¼	Y		63
	77½	8½	65½	89½▲	Buda 4B-153	49			Conv	2	2	Fr	6.6	6.6	45		N	17x7x12½	15x5x11¼	Y		64
	77½	8½	65½	89½▲	Buda 4BD-153	40½			Conv	2	2	Fr	6.6	6.6	45		N	17x7x12½	15x5x11¼	Y		65
	86	15½	72	103½	Buda 4B-153	49			Conv	2	2	Fr			45		N	7.00/12	6.50/10	Y		66
	86	15½	72	103½	Buda 4BD-153	40½			Conv	2	2	Fr			45		N	7.00/12	6.50/10	Y		67
94¼	79½	8	67	92	Buda 4B-153	49			Conv	2	2	Fr	6.6	6.6	45		N	18x8x12½	16¼x5x11¼	Y		68
94¼	79½	8	67	92	Buda 4BD-153	40½			Conv	2	2	Fr	6.6	6.6	45		N	18x8x12½	16¼x5x11¼	Y		69
	82½	7½	71	96½▲	Buda 4B-153	49			Conv	2	2	Fr	6.8	6.8	45		N	20x7x16	15x5x11¼	Y		70
	82½	7½	71	96½▲	Buda 4BD-153	40½			Conv	2	2	Fr	6.8	6.8	45		N	20x7x16	15x5x11¼	Y		71
	88	9½	74⅝	102▲	Buda 6B-230	78			Conv	2	2	Fr	6.8	6.8	45		N	20x8x16	15x6x11¼	Y		72
	88	9½	74⅝	102▲	Buda 6BD-230	60			Conv	2	2	Fr	6.8	6.8	45		N	20x8x16	15x6x11¼	Y		73
	96	13¾	76¾	111▲	Buda 6B-230	78			Conv	2	2	Fr	6.8	6.8	45		N	20x9x16	15x6x11¼	Y		74
	96	13¾	76¾	111▲	Buda 6BD-230	60			Conv	2	2	Fr	6.8	6.8	45		N	20x9x16	15x6x11¼	Y		75
	111	20	91	131▲	Buda 6B-230	78			Conv	2	2	Fr	8.5	9.0	45		N	7.50/15	7.50/10	Y		76
	111	20	91	131▲	Buda 6BD-230	60			Conv	2	2	Fr	8.5	9.0	45		N	7.50/15	7.50/10	Y		77
36	156	120	192	192	Chry 31A	90	6	135	Conv	4	1	Fl	25.0	4.0	72	72	N	10.00/18	7.50/15	Y	16000	78
80	182	132	216	216	Chry 17A	107	6	135	Conv	4	1	Fl	30.0	4.0	60	60	N	12.00/20	8.25/15	Y	20000	79
80	192	132	216	216	Int BLD-269	100	6	135	Conv	4	4	Fr	30.0	30.0	60	60	N	12.00/20	8.25/15	Y	20000	80
	58		51½	68⅝	General Electric					3	3	Ele	6.5	6.5	24	76½	Y	16¼x4x11½	13x3½x8¼	Y		81
	62		57	73¾	General Electric					4	4	Ele	6.5	6.5	39	93	Y	16¼x6x11¼	13x4½x8	Y		82
	69		63½	83¾	General Electric					4	4	Ele	6.5	6.5	21	80½	Y	21x6x15	15½x5x10	Y		83
	78		68¼	92¾	Allis Chalmers					4	4	Ele	6.7	6.7	28	106½	Y	21x7x15	15½x6x10	Y		84
	78		68¼	92¾	Allis Chalmers					4	4	Ele	6.7	6.7	24	93	Y	21x8x15	15½x6x10	Y		85
	84		75½	99½	Allis Chalmers					4	4	Ele	6.2	6.2	21½	147½	Y	22x9x16	15½x6x10	Y		86
	86		78	101½	Allis Chalmers					4	4	Ele	6.2	6.2	19½	159½	Y	22x9x16	15½x6x10	Y		87
	57		49	67⅝	Cont N-62	14			Conv	1	1	Fr	5.0	4.5	40		N	16¼x4x11½	13x3½x8¼	Y		88

For Abbreviations and References see pages 96 and 97

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (in.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	OVERALL DIMENSIONS: Wheelbase (in.)	Face of Forks to Centerline of Front Axle	Length: Load Center (in.)	Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Overall—Including Carriage or Backrest Extension
	Clark—(Continued)																									
1	CE-2024	2000	24	4380	S	Fk	Hyd	Y	10	3	36	13¾	40°	67¼	30†	....	3⅞	3	64	66½	83	115⅝	148¾	97	130	....
2	CL-3024	3000	24	6750	S	Fk	Hyd	Y	10	3	40	15½	40°	73⅜	36†	....	4¾	2¾	62	68	83	121⅛	193	100	172	....
3	CL-4024	4000	24	7240	S	Fk	Hyd	Y	10	3	48	15½	40°	80½	36†	....	4¾	2¾	62	68	83	121⅛	193	100	172	....
4	CL-5024	5000	24	8020	S	Fk	Hyd	Y	10	3	48	15½	40°	83½	36†	....	4¾	2¾	62	68	83	121⅛	193	100	172	....
5	UT-6024	7000	18	9750	S	Fk	Hyd	Y	10	3	54	15½	45°	88	42†	....	4¾	2⅝	25	60	117	95½	203½	72	180	....
6	UT-7024	8000	18	10450	S	Fk	Hyd	Y	10	3	54	15½	45°	89¼	42†	....	4¾	2⅝	25	60	117	95½	203½	72	180	....
7	UT-100	10000	24	12860	S	Fk	Hyd	Y	10	3	66	17	45°	108	42†	....	6¼	2½	7	70	116	102¾	194¾	72	164	....
8	Y-20	2000	24	4000	S	Fk	Hyd	Y	10	3	40	14¼	40°	72⅜	30†	....	6	5	6⅞	60	90	93	153	72	132	....
9	Y-40	4400	15	6570	S	Fk	Hyd	Y	10	3	55	17⅝	40°	94 1/16	36†	....	7½	5	6½	61½	98½	94½	166½	72	144	....
10	Y-60	6500	15	9870	S	Fk	Hyd	Y	10	3	70	20¼	40°	111	42†	....	9¾	4⅝	6¾	65	115	98¼	194¼	72	168	....
11	Y-100	10000	24	14145	S	Fk	Hyd	Y	12	4	86	23	49°	133⅜	48†	....	9¾	4¼	....	81	150	118	244	84	210	....
12	Y-150	15000	24	18330	S	Fk	Hyd	Y	12	4	100	27½	54°	170½	48†	....	15½	6½	....	89	152	129¾	255¼	84	210	....
13	**Crescent** JCL-1-15	1000	15	2120	S	Fk	Hyd	Y	10	3	36½	12⅝	15	60⅝	....	....	6	4	29	68	83	108	137	91	120	137
14	JCL-1	....	....	2445	S	Fk	Hyd	Y	10	3	36½	13⅝	24	64¼	....	....	6	4	29	68	83	108	137	91	120	137
15	JCL-1.5	....	....	2975	S	Fk	Hyd	Y	10	3	36	14¾	24	65¼	....	....	6	4	29	68	83	108	137	91	120	137
16	JCH-2	2000	15	....	S	Fk	Hyd	Y	10	5	39	11¾	24	63	....	....	6	4	66	68	83	108	138	90	130	138
17	JCH-3	3000	24	....	S	Fk	Hyd	Y	10	5	38½	....	24	65½	....	....	4	3	64⅝	68	83	123	153	100	130	153
18	JEH-1	1000	15	....	St	Fk	Hyd	Y	5	3	34½	11	24	53	....	....	3	3	66	68	83	107	137	90	120	137
19	JEH-2-18	2000	15	....	St	Fk	Hyd	Y	5	3	34½	11½	18	55½	....	....	3	3	66	68	83	107	137	90	130	137
20	JEH-2	2000	15	....	St	Fk	Hyd	Y	5	3	34½	11½	24	57½	....	....	3	3	66	68	83	107	137	90	130	137
21	JEH-3	3000	24	....	St	Fk	Hyd	Y	5	3	42	13¾	24	64½	....	....	4	3	64½	68	83	122	152	100	130	152
22	MEH-4	4000	24	....	St	Fk	Hyd	Y	5	3	42	15½	24	68¼	....	....	4	3	63⅝	68	83	122	152	100	130	152
23	MCH-4	4000	24	....	S	Fk	Hyd	Y	10	5	40	15¾	24	71½	....	....	4	3	63⅝	68	83	123	153	100	130	153
24	MCH-5	5000	24	....	S	Fk	Hyd	Y	10	5	41	16¾	24	76¾	....	....	4	3	64	68	83	122½	152½	100	130	152½
25	MCH-6	6000	24	....	S	Fk	Hyd	Y	10	5	44	16¾	24	82¾	....	....	4	3	64	68	83	122½	146½	100	124	146½
26	MCL-7	7000	24	....	S	Fk	Hyd	Y	10	5	55	18½	24	94½	....	....	5	4	7¼	....	83	....	142½	....	120	142½
27	MCL-8	8000	24	....	S	Fk	Hyd	Y	10	5	55	18½	24	94½	....	....	5	4	7¼	....	83	....	142½	....	120	142½
28	**Elwell-Parker** F-26T2	2000	15	5000‡	S	Fk	Hyd	Y	10	5	40	14⅝	24	67⅝	36	48	3¼	....	17	83	....	....	148	....	130	149
29	F-26T2	2000	15	4800‡	S	Fk	Hyd	Y	10	5	40	14⅝	24	67⅝	36	48	3¼	....	50	68	....	....	118	....	100	119
30	F-38T	2000	20	4985‡	St	Fk	Hyd	Y	10	5	43½	10¼	20	63	30	36	5	....	50	68	....	....	118	....	100	119
31	F-30T3	3000	24	7300‡	S	Fk	Hyd	Y	12	5	42	12	24	73¼	36	48	8	....	17	83	....	....	147	....	130	149
32	F-30T3	3000	24	7000‡	S	Fk	Hyd	Y	12	5	42	12	24	73¼	36	48	8	....	50	68	....	....	118	....	100	120
33	F-30T4	4000	24	7600‡	S	Fk	Hyd	Y	12	5	46	13⅜	24°	78⅞	36	48	7	....	17	83	....	....	147	....	130	149
34	F-30T4	4000	24	7400‡	S	Fk	Hyd	Y	12	5	46	13⅜	24°	78⅞	36	48	7	....	50	68	....	....	117	....	100	119
35	F-31T6	6000	24	9900‡	S	Fk	Hyd	Y	12	5	48	14¾	24°	82¾	36	48	6½	....	17	86	....	....	145	....	126	147
36	F-31T6	6000	24	9650‡	S	Fk	Hyd	Y	12	5	48	14¾	24°	82¾	36	48	6½	....	50	68	....	....	117	....	96	119
37	F-31T7	7000	24	10565‡	S	Fk	Hyd	Y	12	5	54	14¾	24°	88¾	36	48	6½	....	17	83	....	....	145	....	96	147
38	F-39T8	8000	24	10000‡	S	Fk	Hyd	Y	12	5	54	18	24°	94	36	48	9½	....	17	....	83	....	140	116	....	152
39	F-39T10	10000	24	13300‡	S	Fk	Hyd	Y	12	5	61	19	24°	98	36	48	8	....	17	....	83	....	137	110	....	146
40	F-25T	10000	24	15000‡	St	Fk	Ch	Y	12	3	60	17	24°	102	36	48	4½	....	67	....	95	....	151	124	....	152
41	F-5	12000	36	18500‡	St	FR	Ch	Y	10	3	72	17	30°	111	....	60	4½	....	55	....	....	....	95	55	73	95
42	F-6	15000	36	22600‡	St	Fkr	Ch	Y	10	3	72	17	36°	117	....	72	4½	....	57	....	96	....	96	57	75	96
43	F-6	16000	36	24900‡	St	Fkr	Ch	Y	10	3	72	17	39°	145	....	78	4½	....	53	....	96	96	....	53	71	96
44	E-11	4000	24	3300	St	Ptf	Ch	N	N	N	....	....	....	97¼	41	60	1½	2½	64	83	....	....	....	....	64	....
45	E-11-T	4000	24	3725	St	Ptf	Ch	Y	N	N	....	....	....	97¼	41	60	1½	2½	65½	83	....	....	141¾	....	124	....
46	E-2	4000	24	3700	St	Ptf	Ch	N	N	N	....	....	....	119½	54	72	....	4¾	62½	83	....	....	....	....	62½	....
47	E-2-T	4000	24	4400	St	Ptf	Ch	Y	N	N	....	....	....	119½	54	72	....	4¾	63½	83	....	....	133½	....	114	....
48	ELN-6	6000	24	4750	St	Ptf	Ch	Y	N	N	....	....	....	125 1/16	54	84	....	....	62	83	....	....	....	....	62	....
49	ELN-6-T	6000	24	5500	St	Ptf	Ch	Y	N	N	....	....	....	125 1/16	54	84	....	....	62⅝	83	....	....	133⅝	113	....	....
50	ELN-10	10000	24	6000	St	Ptf	Ch	Y	N	N	....	....	....	136½	60	108	....	....	69½	95	....	....	....	69½	....	....
51	ELN-10-T	10000	24	8200	St	Ptf	Ch	Y	N	N	....	....	....	136½	60	108	....	....	70	95	....	....	142¾	118	....	....
52	ELN-16	16000	36	8500	St	Ptf	Ch	N	N	N	....	....	....	139½	60	....	....	....	57	95	....	....	95	57	....	....
53	ELN-20	20000	36	9900	St	Ptf	Ch	N	N	N	....	....	....	141¾	62	....	....	....	57	95	....	....	95	57	....	....
54	ELN-30	30000	SA	13500	St	Ptf	Ch	N	N	N	82	....	....	157	72	....	4½	....	57	107	....	107	....	57	....	107
55	ELB-50	50000	SA	20000	St	Ptf	Ch	N	N	N	75	....	....	158½	72	....	4½	....	51	102	....	102	....	51	....	102
56	E-12-20	20000	36	16000	St	Ptf	Hyd	N	N	N	63	....	....	153	62	....	1½	1½	48	83	....	....	....	48	....	....
57	E-12-30	30000	SA	22000	St	Ptf	Hyd	N	N	N	90	....	....	180	94	....	5½	5½	60	108	....	....	....	60	....	....
58	E-12-40	40000	SA	28000	St	Ptf	Hyd	N	N	N	90	....	....	184	84	....	3½	3½	60	108	....	....	....	60	....	....
59	E-12-60	60000	SA	28600	St	Ptf	Hyd	N	N	N	90	....	....	195	94	....	5½	5½	60	116	....	....	....	60	....	....
60	E-12-80	80000	SA	29800	St	Ptf	Hyd	N	N	N	79	....	....	208	102	....	2	2	72	134	....	....	....	72	....	....
61	R-20	30000	42	27000*	St	R	Hyd	N	N	N	100	26	42°	150	....	84	7	7	95	136†	....	....	....	95†	....	138
62	R-30	30000	42	38800*	St	R	Hyd	N	N	N	100	26	42°	151	....	84	7	7	95	141†	....	....	....	95†	....	141
63	R-40	40000	39	52800*	St	R	Hyd	N	N	N	110	26½	39°	171½	....	78	7	7	100	144†	....	....	....	100†	....	144
64	R-50	50000	42	60700*	St	R	Hyd	N	N	N	110	27	42°	172	....	84	7	7	94	144†	....	....	....	94†	....	144
65	R-60	60000	48	68900*	St	R	Hyd	N	N	N	110	27	45°	172	....	90	7	7	88	144†	....	....	....	88†	....	144
66	F-45T3	3000	24	5300*	S	Fk	Hyd	Y	10	5	43	14½	24°	72½	....	48	6¾	....	50	83†	....	....	....	....	130	149
67	**Erickson** F2R	Var	....	4200	S	Fk	Hyd	Y	10	4	42	20	24°	72	30	48	10	6	58	48	104	48	192	16	168	....
68	F4R	Var	....	6200	S	Fk	Hyd	Y	10	4	72	22	24°	110	30	48	12	5¼	4	48	116	48	208	18	180	....
69	F6R	Var	....	7800	S	Fk	Hyd	Y	10	4	73	22	30°	118	30	54	13	7¾	4	48	118	48	210	18	180	....
70	F8R	Var	....	11500	S	Fk	Hyd	Y	12	7	99	30	36°	147	48	66	13	11	4	60	144	106	250	72	216	....
71	**Gerlinger** S-16	16000	28	21000	S	Fk	Hyd	Y	9	6	106	24	36°	158	48	96	13½	11½	N	114	162	194	290	120	216	296
72	L-16	16900	24	19350	S	Fk	Hyd	Y	8	7	130	28½	48°	191	48	96	13½	10¼	N	114	174	194	314	120	240	194
73	L-12	12685	24	17150	S	Fk	Hyd	Y	8	7	130	....	48°	191	48	96	....	10¼	....	113½	173½	194	314	120	240	....
74	L-15	15000	24	18000	S	Fk	Hyd	Y	8	7	130	....	48°	191	48	96	....	10¼	....	113½	173½	194	314	120	240	....
75	L-18	19050	24	20500	S	Fk	Hyd	Y	8	7	130	....	48°	191	48	96	....	10¼	....	114	174	194	314	120	240	....
76	L-20	20000	24	21500	S	Fk	Hyd	Y	8	7	130	....	48°	191	48	96	....	10¼	....	114	174	194	314	120	240	....
77	L-22	22000	24	22500	S	Fk	Hyd	Y	8	7	130	....	48°	191	48	96	....	10¼	....	114	174	194	314	120	240	....
78	S-8	8000	21	15825	S	Fk	Hyd	Y	9	6	106	....	36°	150	42	72	....	10½	....	103	151	194	290	120	216	....
79	S-10	10000	21	16000	S	Fk	Hyd	Y	9	6	106	....	36°	150	42	72	....	10½	....	103	151	194	290	120	216	....
80	S-12	12000	24	17650	S	Fk	Hyd	Y	9	6	106	....	36°	151	48	72	....	11½	....	102	158	194	290	120	216	....
81	S-15	15000	24	19500	S	Fk	Hyd	Y	9	6	106	....	36°	154	48	72	....	11½	....	102	162	194	290	120	216	....
82	**HH** SPHL	4000	14	6000	S	Fk	Hyd	Y	15	7	72	....	24°	....	24	48	....	....	....	....	....	106	....	....	144	....
83	**Hyster** ON-20	1000	24	3020	S	Fk	Hyd	Y	11	3	45	14¼	24	71	24	48	3⅛	3⅝	2	61	88	96	150	72	126	150
84	ON-20	2000	15	3620	S	Fk	Hyd	Y	11	3	45	14¼	15	71	24	48	3⅛	3⅝	2	61	88	96	150	72	126	150

For Abbreviations and References see pages 96 and 97

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Truck: Forward (mph)	Truck: Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
Overall—Including Carriage or Backrest																					
65	.....	56	77¼	Cont T-91	22½	.....	.....	Conv	2	2	Fr	8.2	7.1	41	.....	N	16¼x6x11¼	13x4½x8	Y	.....	1
71½	.....	65	86⅛	Cont F-4124	31½	.....	.....	CA	2	2	FE	7.0	6.0	42	.....	N	21x6x15	15½x6x10	Y	.....	2
78	.....	68	92⅝	Cont F-4124	31½	.....	.....	CA	2	2	FE	7.0	6.0	40	.....	N	21x7x15	15½x6x10	Y	.....	3
81½	.....	70	96⅛	Cont F-4124	31½	.....	.....	CA	2	2	FE	7.0	6.0	38	.....	N	21x8x15	15½x6x10	Y	.....	4
85	.....	74½	100½	Cont F-6209	50	.....	.....	CA	2	2	FE	7.3	6.3	35	.....		22x9x16	15½x6x10	Y	.....	5
86	.....	75½	101½	Cont F-6209	50	.....	.....	CA	2	2	FE	7.3	6.3	35	.....		22x9x16	15½x6x10	Y	.....	6
105	.....	87½	122	Cont F-6209	50	.....	.....	Aut	2	2	Ele	6.0	6.0	26	.....	Y	22x12x16	17x7x12⅛	Y	.....	7
71¾	.....	59	85⅝	Cont Y-91	22½	.....	.....	Conv	1	1	Fr	8.5	7.3	46	.....	N	6.00/9	5.00/8	Y	.....	8
85½	.....	73	103½	Cont F-4124	31½	.....	.....	Conv	3	3	Fr	10.2	10.2	40	.....	N	7.00/12	6.00/9	Y	.....	9
114	.....	94	134¼	Cont F-6209	50	.....	.....	Conv	3	3	Fr	11.5	11.5	35	.....	N	7.50/15	7.50/10	Y	.....	10
135½	.....	116	158½	Cont F-6209	55	.....	.....	Conv	4	4	Fr	18.0	18.0	26¾	.....	N	8.25/18	7.50/15	Y	.....	11
165	.....	136	192½	Her QXLD-3	82½	.....	.....	Conv	4	4	Fr	23.7	21.4	42½	.....	N	8.20/20	8.25/15	Y	.....	12
61■	.....	54■	97⅜■	Kimble	.....	32	204	.....	4	4	.....	5.0	5.0	30	40	Y	.....	.....	.....	.....	13
61■	.....	54■	98¾■	Kimble	.....	32	204	.....	4	4	.....	5.0	5.0	30	40	Y	.....	.....	.....	.....	14
62■	.....	54■	106¼	Kimble	.....	32	350	.....	4	4	.....	5.0	5.0	25	40	Y	.....	.....	.....	.....	15
63■	.....	57■	120■	Kimble	.....	32	350	.....	4	4	.....	5.5	5.5	30	35	Y	.....	.....	.....	.....	16
68■	.....	64■	126■	Kimble	.....	32	.....	.....	4	4	.....	5.5	5.5	30	35	Y	.....	.....	.....	.....	17
48■	.....	48■	102■	Kimble	.....	32	.....	.....	4	4	.....	4.5	4.5	34	40	Y	.....	.....	.....	.....	18
52■	.....	52■	104■	Kimble	.....	32	.....	.....	4	4	.....	4.5	4.5	32	40	Y	.....	.....	.....	.....	19
52■	.....	53■	106■	Kimble	.....	32	.....	.....	4	4	.....	4.5	4.5	32	40	Y	.....	.....	.....	.....	20
58■	.....	58■	114■	Kimble	.....	32	.....	.....	4	4	.....	4.5	4.5	30	30	Y	.....	.....	.....	.....	21
60■	.....	62■	118■	Kimble	.....	32	500	.....	4	4	.....	4.5	4.5	24	30	Y	.....	.....	.....	.....	22
70■	.....	65■	130■	Kimble	.....	36	.....	.....	4	4	.....	5.0	5.0	25	35	Y	.....	.....	.....	.....	23
78■	.....	68■	138■	Kimble	.....	36	.....	.....	4	4	.....	5.0	5.0	24	40	Y	.....	.....	.....	.....	24
83■	.....	70■	144■	Kimble	.....	36	.....	.....	4	4	.....	5.0	5.0	22	40	Y	.....	.....	.....	.....	25
89■	.....	76■	.....	Kimble	.....	36	.....	.....	4	4	.....	6.0	6.0	.....	.....	Y	.....	.....	.....	.....	26
89■	.....	76■	.....	Kimble	.....	36	.....	.....	4	4	.....	6.0	6.0	.....	.....	Y	.....	.....	.....	.....	27
67	8	58	111⅜	Own	.....	30	(11)	N	4	4	.....	6.0	6.0	29	40	Y	15½x5	10½x5	Y	.....	28
67	8	58	111⅜	Own	.....	30	(11)	N	4	4	.....	6.0	6.0	29	40	Y	15½x5	10½x5	Y	.....	29
57	0	54	99	Own	.....	30	450	N	4	4	.....	6.0	6.0	29	40	Y	16¼x5	9x5	N	.....	30
84	9	68	129	Own	.....	36	(12)	N	4	4	.....	6.0	6.0	28	45	Y	22x6	15½x5	Y	.....	31
84	9	68	129	Own	.....	36	(12)	N	4	4	.....	6.0	6.0	28	45	Y	22x6	15½x5	Y	.....	32
83	10	70	134⅜	Own	.....	36	(13)		4	4	.....	5.5	5.5	25	45	Y	22x7	15½x5	Y	.....	33
83	10	70	134⅜	Own	.....	36	(13)		4	4	.....	5.5	5.5	25	45	Y	22x7	15½x5	Y	.....	34
87	11	72	139¾	Own	.....	36	(14)		4	4	.....	5.0	5.0	20	40	Y	22x8	15½x6	Y	.....	35
87	11	72	139¾	Own	.....	36	(14)		4	4	.....	5.0	5.0	20	40	Y	22x8	15½x6	Y	.....	36
91	13	76	143¾	Own	.....	36	(14)		4	4	.....	5.0	5.0	20	40	Y	22x8	15½x6	Y	.....	37
95	9	80	154	Own	.....	48	(15)				.....	4.0	4.0	17	35	Y	22x10	17x6	Y	.....	38
99	10	83	158	Own	.....	48	(16)				.....	4.0	4.0	15	35	Y	22x12	17x7	Y	.....	39
129	39	92	162	Own	.....	48	(16)				.....	3.5	3.5	10	15	Y	22¾x12	15x8	Y	.....	40
113	19	92	185	Own	.....	60	(17)				.....	4.0	4.0	8	12	Y	22x14	15x6	Y	.....	41
118	16	100	195	Own	.....	60	800				.....	5.0	5.0	9	15	Y	22x16	4x18x7	Y	.....	42
126	21	103	207	Own	.....	60	900				.....	5.0	5.0	9	15	Y	22x16	4x18x7	Y	.....	43
88	46	52	131	Own	.....	(18)	.....	.....	4	4	.....	4.0	4.0	14	25	Y	15x5	4x6½x2½	N	.....	44
88	46	52	131	Own	.....	(18)	.....	.....	4	4	.....	4.0	4.0	14	25	Y	15x5	4x6½x2½	N	.....	45
94	38	63	147	Own	.....	(19)	.....	.....	4	4	.....	5.0	5.0	12	20	Y	20x5	10x6	N	.....	46
94	38	63	147	Own	.....	(19)	.....	.....	4	4	.....	5.0	5.0	12	20	Y	20x5	10x6	N	.....	47
99	42	68	159	Own	.....	(19)	.....	.....	4	4	.....	4.8	4.8	12	14	Y	22x6	10x6	N	.....	48
99	42	68	159	Own	.....	(19)	.....	.....	4	4	.....	4.8	4.8	12	14	Y	22x6	10x6	N	.....	49
126	66	73	183	Own	.....	(19)	.....	.....	4	4	.....	3.8	3.8	8	15	Y	22x6	10x6	N	.....	50
126	66	73	183	Own	.....	(19)	.....	.....	4	4	.....	3.8	3.8	8	15	Y	22x6	10x6	N	.....	51
128	65	78	185	Own	.....	(20)	.....	.....	4	4	.....	3.0	3.0	7	12	Y	22x6	4x10x7	N	.....	52
158	92	88	206	Own	.....	(20)	.....	.....			.....	3.0	3.0	7	12	Y	22x7	4x15x9	N	.....	53
163	93	95	225	Own	.....	(21)	.....	.....	4	4	.....	3.0	3.0	4	8	Y	.....	.....	N	.....	54
168	91	102	229	Own	.....	(21)	.....	.....	4	4	.....	2.0	2.0	1½	2½	.....	22x10	18x12	N	.....	55
149	79	88	208	.....	.....	(1)	.....	.....	4	4	.....	3.5	3.5	10	20	Y	22x7	15x9	N	.....	56
169	87	107	247	.....	.....	(1)	.....	.....	4	4	.....	3.0	3.0	8	17	Y	22x8	15x7	N	.....	57
.....	103	124	269	.....	.....	(1)	.....	.....	4	4	.....	2.5	2.5	6	14	Y	22x10	5x8	N	.....	58
193	108	118	274	.....	.....	(1)	.....	.....	4	4	.....	2.5	2.5	6	14	Y	22¾x10	18x5	N	.....	59
220	113	134	294	.....	.....	(1)	.....	.....	4	4	.....	2.5	2.5	6	14	Y	22¾x14	15x10	N	.....	60
146	28	112	238	Own	.....	72	.....	.....	4	4	.....	5.0	5.0	12	25	Y	36x12	20x8	.....	.....	61
182	33	126	254	Own	.....	72	.....	.....	4	4	.....	4.0	4.0	10	25	Y	36x16	22¾x8	.....	.....	62
191	34	161	278	Own	.....	72	.....	.....	4	4	.....	3.5	3.5	8	40	Y	36x20	36x16	.....	.....	63
191	29	156	278	Own	.....	72	.....	.....	4	4	.....	3.0	3.0	6	40	Y	36x22	36x18	.....	.....	64
191	25	159	278	Own	.....	72	.....	.....	4	4	.....	2.5	2.5	6	40	Y	36x24	36x20	.....	.....	65
72	9½	65	127	Own	.....	(4)	.....	.....	4	4	.....	6.0	6.0	25	45	Y	22x6	16¼x5	.....	.....	66
89	6	70	126	Int U2A	24	6	20	Conv	4	4	Fr	12.0	12.0	45	.....	N	6.00/16	6.00/9	N	.....	67
107	18	94	174	Int U2A	24	6	20	Conv	4	4	Fr	25.0	25.0	45	.....	N	7.50/15	7.50/15	N	.....	68
123	38	96	184	Int U2A	24	6	20	Conv	4	4	Fr	25.0	25.0	42	.....	N	8.25/15	8.25/15	N	.....	69
156	48	132	215	Int U164	38	6	20	Conv	4	4	Fr	25.0	25.0	35	.....	N	8.25/20	7.50/15	N	.....	70
148	10	124	.....	Ford ..... JG	130	.....	.....	Conv	4	4	Fr	.....	.....	30	42	N	8.25/15	8.25/15	N	.....	71
180	24	140	.....	Ford ..... JG	130	.....	.....	Conv	4	4	Fr	.....	.....	28	42	N	9.00/15	9.00/15	Y	7500	72
180	24	140	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	32	42	.....	8.25/15	8.25/15	.....	.....	73
180	24	140	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	30	42	.....	8.25/15	8.25/15	.....	.....	74
180	24	140	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	24	38	.....	9.00/15	9.00/15	.....	.....	75
180	24	140	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	18	29	.....	9.00/15	9.00/15	.....	.....	76
180	24	140	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	18	29	.....	9.00/15	9.00/15	.....	.....	77
140	10	120	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	38	42	.....	7.50/15	7.50/15	.....	.....	78
140	10	120	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	38	42	.....	7.50/15	7.50/15	.....	.....	79
141	10	120	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	32	42	.....	8.25/15	8.25/15	.....	.....	80
144	10	124	.....	Ford ..... JG	130	.....	.....	.....	.....	.....	.....	.....	.....	30	42	.....	8.25/15	8.25/15	.....	.....	81
.....	.....	.....	.....	Chry	98	.....	.....	.....	2	2	.....	20.0	20.0	30	30	.....	6.00/9	9.00/16	.....	.....	82
67	11	59	132	Wis VF-4	25	.....	.....	Conv	2	2	Fr	13.7	11.9	55	55	N	6.00/9	6.00/9	Y	1170	83
67	11	59	132	Wis VF-4	25	.....	.....	Conv	2	2	Fr	13.7	11.9	55	55	N	6.00/9	6.00/9	Y	1170	84

For Abbreviations and References see pages 96 and 97

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (in.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	Wheelbase (in.)	Face of Forks to Centerline of Front Axle	Load Center (in.)	OVERALL DIMENSIONS: Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Height: Overall—Including Carriage or Backrest
	Hyster—(Continued)																									
1	ON-20	2000	24	3980	S	Fk	Hyd	Y	11	3	45	14¼	24	73¼	24	48	3⅛	3⅝	2	61	88	96	150	72	126	150
2	UC-30	3000	24	5705	S	Fk	Hyd	Y	10	5	50	12	24	74⅝	30	60	5½	2½	30	70½	100½	106½	166½	84	144	186⅝
3	YC-40	4000	24	6305	S	Fk	Hyd	Y	10	5	50	12	24	78¾	30	60	5½	2½	30	70½	100½	106½	166½	84	144	186⅝
4	YT-40	4000	15	5900	S	Fk	Hyd	Y	10	4	56	16	15	86	30	54	4½	3½	10	65	101	96	168	72	144	168
5	XA-60	6000	24	10530	S	Fk	Hyd	Y	11	5	65	21	24	106⅜	42	84	6	4½	5	64	113½	97½	193½	72	168	193¼
6	ZA-80	8000	24	11660	S	Fk	Hyd	Y	12	4	76	21	24	117⅝	42	84	6	6¼	5	65½	115	99	195	72	168	195
7	RT-100	10000	24	13600	S	Fk	Hyd	Y	10	6	86	23	24	148	42	108	8	5½	0	95	190	144	334	98	288	344½
8	RC-150	15000	24	19250	S	Fk	Hyd	Y	10	6	100	25¼	24	153¾	42	108	12	7½	0	97	192	146	336	98	288	336
9	RC-160	16000	24	19730	S	Fk	Hyd	Y	10	6	100	25¼	24	157¼	42	108	12	7½	0	97	192	146	336	98	288	336
10	SC-180	18000	24	20900	S	Fk	Hyd	Y	10	6	100	25¼	24	158	42	108	12	7½	0	97	192	146	336	98	288	336
11	Kwik Mix S-10	1000	15	1560	St	Fk	Hyd	Y	N	N	34¾	12½	21•	68	20	30	6	3	12	66		84		0	72	84
12	R-15	1500	15	2200	S	Fk	Hyd	Y	10	2	43	13	21•	81	20	30	6	3	N	66		104		0	84	104‡
13	Lewis-Shepard EFFTT-1	1000	24	3320	St	Fk	Hyd	Y	10	3	44	12¼	24•	65⅜	24	48	4½	2½	65	68	91	120	165	97	142	165
14	59	1500	24	3365	St	Fk	Hyd	Y	10	3	44	12¼	24•	65⅜	24	48	4½	2½	65	68	91	120	165	97	142	165
15	EFFTT-2	2000	24	3970	St	Fk	Hyd	Y	10	3	47	12¼	24•	67¾	24	48	4½	2½	65	68	91	120	165	97	142	165
16	61	3000	24	5520	St	Fk	Hyd	Y	10	3	47	13⅜	24•	69¼	24	48	4½	2½	65	68	89	120	161	97	138	161
17	EFFTT-3	3000	24	4936	St	Fk	Hyd	Y	10	3	51	13½	24•	75⅛	24	48	4½	2½	65	68	91	120	165	97	142	165
18	EFFTT-4	4000	24	5936	St	Fk	Hyd	Y	10	3	51	13½	24•	75⅛	24	48	4½	2½	65	68	91	120	165	97	142	165
19	JFTT-1	1000	24	2880	S	Fk	Hyd	Y	10	2	36	6¼	24•	55⅛	24	48	3	2	11	59	83	99	147	82	130	178
20	JFTT-1.5	1500	24	3265	S	Fk	Hyd	Y	10	2	36	6¼	24•	55⅛	24	48	3	2	14	59	83	99	147	82	130	178
21	JFTT-2	2000	24	3350	S	Fk	Hyd	Y	10	2	42	6¼	24•	61⅛	24	48	3	2	14	59	83	99	147	82	130	178
22	E1SCTL	1000	24	3060	W	Fk	Hyd	Y	5	0	32	6¼	24•	46⅜	24	48	3		11	59	83	100	148	82	130	178
23	E1.5SCTL	1500	24	3160	W	Fk	Hyd	Y	10	2	42	6¼	24•	56⅜	24	48	3		14	59	83	99	147	82	130	178
24	E2SCTL	2000	24	3180	W	Fk	Hyd	Y	10	2	48	6¼	24•	62¾	24	48	3		14	59	83	99	147	82	130	178
25	E2.5SCHTL	2500	24	3210	W	Fk	Hyd	Y	10	2	54	6¼	24•	68¾	24	48	3		18	59	83	99	147	82	130	178
26	E3SCRTL	3000	24	3410	W	Fk	Hyd	Y	10	2	66	6¾	24•	81¼	24	48	3		18	59	83	96	144	76	124	172
27	M2SST	2000	24	2900	St	Fk	Hyd	Y					24•	29	30	48	2	3	11½	59	83	97	145	77	125	173
28	M3SST	3000	24	2900	St	Fk	Hyd	Y					24•	29	30	48	2	3	11½	59	83	97	145	79	127	145
29	M3SOT	3000	24	2600	St	Fk	Hyd	Y					32•	26¼	36	48	2	3	11½	59	83	97	145	79	127	145
30	M3SPT	3000	24	2575	St	Ptf	Hyd	Y					36•	26¼	24	54	2	3	25	59	83	94	144	73	125	144
31	E4SST	4000	24	2750	W	Fk	Hyd	Y					32•	29½	36	48	2	3	30	59	83	92	144	73	129	144
32	E4SOT	4000	24	2350	W	Fk	Hyd	Y					32•	26½	36	48	2	2	25	59	83	92	144	67	124	144
33	E4SPT	4000	24	2125	W	Ptf	Hyd	Y					36•	26½	36	54	2	2	30	59	83	92	144	73	129	144
34	Lift Trucks KHL	2000		1405	W	Fk	HC	Y						36 15/16	24	42		1½		53	83	81¾	141¾	60	120	141¾
35	KHCM-18	1000	18		W	Fk	HC	Y																		
36	HHL	1000			W	Fk	HE	Y						21 11/16	30	42				53	83			60	120	
37	HHL	2000			W	Fk	HE	Y						21 11/16	30	42				53	83			60	120	
38	K3HL	3000	24	2700	W	Fk	Hyd	Y	N	N	73⅛		24•		24	42	2	2	4	53	83	81¾	141¾	60	120	141¾
39	K2HCM	2000	12	3300	W	Fk	Hyd	Y	N	N	39	6½	48•	56	24	42	3⅜		4	54⅞	84⅞	82	142	60	120	142
40	K2HW	2000	15	2650	W	Ptf	Hyd	Y	N	N	Var						2½	2½		83		83			60	83
41	K4HW	4000	24	2800	W	Ptf	Hyd	Y	N	N	Var						2½	2½		83		83			60	83
42	MacDonald D	‡4500	24	12500	S	Fk	Hyd	Y	12	4	49¼		43⅜						93•	90	124	156	226	132	200	241
43	Market Forge FT-55	2400	24	2100	Ss	Fk	Hyd	opt	10	5	31⅜	5⅝	24•	55½	6	72	5½	2¾	63•	63	83	106	146	86	126	182
44	FT-63	2400	36	2100	Ss	Fk	Hyd	opt	10	5	39	5⅛	36•	63½	6	72	5½	2¾	63•	63	83	106	146	86	126	182
45	TL-26	4000	24	2000	Ss	Ptf	Hyd	opt	N	N	56½	30	24•	43½	30	48	3	2¾	63•	63	83	106	146	86	126	146
46	Mercury A-2304	2001	24	3800	S	Fk	Hyd	Y	10	3	33⅞	13⅜	24•	58¼		60	4¾			Sp	Sp	Sp	Sp	Sp	Sp	Sp
47	A-3404	2500	24	4100	S	Fk	Hyd	Y	10	3	40	13¾	24•	62½		60	4¾			Sp	Sp	Sp	Sp	Sp	Sp	Sp
48	A-3444	3000	24	4350	S	Fk	Hyd	Y	10	3	44	13¾	24•	66⅜		60	4½			Sp	Sp	Sp	Sp	Sp	Sp	Sp
49	A-4304	4000	24	6100	S	Fk	Hyd	Y	10	4	48	15¾	30•	80¾		60	5			Sp	Sp	Sp	Sp	Sp	Sp	Sp
50	A-1484	4000	24	7000	St	Fk	Hyd	Y	15	5	48¼	17	30•	83¾		60	6½			Sp	Sp	Sp	Sp	Sp	Sp	Sp
51	A-1544	6000	24	8700	St	Fk	Hyd	Y	15	5	54	18	30•	89¾		60	6½			Sp	Sp	Sp	Sp	Sp	Sp	Sp
52	A-1005	3000		2700		Ptf	Hyd																		115	
53	A-1005	4000		2880		Ptf	Hyd																		115	
54	A-1006	3000		2400		Ptf	Hyd																		67	
55	A-1006	4000		2600		Ptf	Hyd																		67	
56	A-1018	4000		3500		Ptf	Hyd																		62¼	
57	A-1019	4000		4300		Ptf	Hyd																		113	
58	A-1001	6000		3700		Ptf	Hyd																		62¼	
59	A-1003	6000		4500		Ptf	Hyd																		113	
60	A-1013	10000		5200		Ptf	Hyd																		57	
61	A-6304	6000	24	7300	S	Fk	Hyd	Y	10	4	54	16¼	24			60	5			Sp	Sp	Sp	Sp	Sp	Sp	Sp
62	Raymond E2ST	2000	24	2200	St	Fk	Hyd	Y	N	N	51 5/16•	N	24	31 3/16	30	44	2	2	45½	83	N	130	N	127	N	157¼
63	E3ST	3000	24	2300	St	Fk	Hyd	Y	N	N	51 5/16•	N	24	31 3/16	30	44	2	2	51	83	N	118	N	115	N	148
64	E2S	2000	24	1800	St	Fk	Hyd	N	N	N	51 5/16•	N	24	31 3/16	30	44	2	2	53	83	N	65	N	62	N	89¼
65	E2FT	2000	24	1900	St	Fk	Hyd	Y	N	N	54 1/16•	N	24	31 1/16	30	42	2	1¾	44¾	83¾	N	132	N	128½	N	153¼
66	E4ST	4000	24	3350	St	Fk	Hyd	Y	N	N	56 1/16•	N	24	33 1/16	30	44	2	2	54⅜	83	N	128	N	126	N	152½
67	E2RT	2000	24	2750	St	Fk	Hyd	Y	N	N	46 1/16•	N	24	34 1/16	30	44	2	2	41	83	N	118	N	115	N	162½
68	E3RT	3000	24	4200	St	Fk	Hyd	Y	N	N	47½•	N	24	36¼	30	44	2	2	31⅞	83	N	116	N	116	N	170½
69	E4PT	4000	24	3400	St	Ptf	Hyd	Y	N	N	60 1/16•	N	30	31 1/16	30	48	2	2	54⅞	83	N	125	N	119	N	147½
70	E2P	2000	24	1800	St	Ptf	Hyd	N	N	N	54 7/16•	N	24	29⅝	30	48	2	2	65	83	N	71	N	65	N	86
71	E2PT	2000	24	1850	St	Ptf	Hyd	Y	N	N	55 1/16•	N	24	29 1/16	30	48	2	2	52	83	N	127	N	121	N	149¼
72	E4P	4000	24	1900	St	Ptf	Hyd	N	N	N	55 1/16•	N	30	30 1/16	30	48	2	2	62½	83	N	64	N	58	N	84¼
73	E2F	2000	24	1850	St	Fk	Hyd	N	N	N	54 1/16•	N	24	31 1/16	30	42	2	1¾	62¼	83	N	67½	N	64	N	88¼
74	Revolvator 52122	2500	24	1650	W	Fk	HC	Y			Var		48•	38		42		3½	13	68	104	102	173	85	156	
75	52123	3000	24	Var	W	Fk	HC	Y	10	2	Var	5	48•	Var		42		3½	13	68	104	102	173	85	156	
76	52112	4000	24	1700	W	Ptf	HC	N			(47)			28½	36	60		3½		83	101	102		65½	93½	
77	Ross 5S	5000	15	6000	S	Fk	Hyd	Y	12	6	61	43¾	30•	91¾	30†		7¾			64⅝	100⅝	100⅝	172⅜	72	144	
78	5S-FL	4000	15	6000	S	Fk	Hyd	Y	12	6	61	43¾	30•	91¾	30†		7¾		72•	64⅝	100⅝	100⅝	172⅜	72	144	
79	6S	6000	24	9000	S	Fk	Hyd	Y	12	6	66	62	39•	115	42†				72•	70	115	106	199	72	168	
80	10H	12000	24	14600	S	Fk	Hyd	N	12	4	90	67	48•	146	42†				6	110	170	167	287	120	240	
81	10L	8000	24	12800	S	Fk	Hyd	N	12	4	90	71	48•	146	42†				6	110	170	167	287	120	240	

For Abbreviations and References see pages 96 and 97

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
												Truck									
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Forward (mph)	Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
69¼	11	62	135	Wis VF-4	25			Conv	2	2	Fr	13.7	11.9	55	55	N	6.00/9	6.00/9	Y	1170	1
75	7⅜	65	135	Wau FC-260A	35			Conv	2	2	Fr	9.5	9.0	40	40	N	18x7x12½	14x4½x8	Y	2120	2
75	7⅜	65	135	Wau FC-260A	35			Conv	2	2	Fr	9.5	9.0	40	40	N	18x7x12½	14x4½x8	Y	2110	3
79	10	72	148	Wis VF-4	25			Conv	2	2	Fr	7.2	8.0	45	45	N	7.00/12	6.00/9	Y	1480	4
114	36½	86	183	Her JX4C3	60			Conv	2	2	Fr	12.5	12.0	35	35	N	7.50/15	7.00/12	Y	2100	5
129	43½	99	198	Her JX4D3	68			Conv	2	2	Fr	10.9	10.5	35	35	N	8.25/15	7.00/12	Y	2600	6
180	71	131	259	Int GRD	82½			Conv	4	4	Fr	22.6	22.6	39	39	N	7.50/15	7.50/15	Y	8420	7
177	48	131	250	Her JXE3	91			Conv	4	4	Fr	23.5	23.0	40	40	N	8.25/20	8.25/20	Y	7490	8
177	48	131	250	Her JXE3	91			Conv	4	4	Fr	23.5	23.0	40	40	N	8.25/20	8.25/20	Y	7485	9
179	48	132	252	Her JXE3	91			Conv	4	4	Fr	23.5	23.0	36¾	36¾	N	8.25/20	8.25/20	Y	7475	10
61	6	54		Wis AKN	6			Conv	1		Fr	4.0	4.0	30	30	Y	16¼x4	13x3½	N		11
75	6	64		Wis AEN	8			Conv	1		Fr	6.0	6.0	30	30	N	16¼x4	16x5	Opt	450	12
59	66½	65	111¼	General Electric		30	(22)		4	4		5.0	5.0	46	45	Y	16¼x5	10x6	Y	1600	13
59	66½	65	111¼	General Electric		36	(23)		4	4		5.0	5.0	50	45	Y	16¼x5	10x6	Y	1600	14
61	66½	65	113½	General Electric		30	(24)		4	4		5.0	5.0	40	45	Y	16¼x6	10x6	Y	1600	15
61	67½	66	114¾	General Electric		30	(25)		4	4		5.0	5.0	27	45	Y	16¼x6	9x5	Y	1600	16
66½	67¼	70	120	General Electric		32	(26)		4	4		5.0	5.0	27	45	Y	16¼x6	9x5	Y	1600	17
66½	67¼	70	120	General Electric		32	(26)		4	4		5.0	5.0	26	45	Y	16¼x7	9x5	Y	1600	18
49¼	52¼	65	95½	General Electric		12	(23)		2	2		4.0	4.0	16	25	Y	10½x6	9x6	N		19
49¼	52¼	66	95½	General Electric		12	(23)		2	2		4.0	4.0	15	25	Y	10½x6	9x6	N		20
55¼	52¼	67	101½	General Electric		12	(26)		2	2		4.0	4.0	13	25	Y	10½x6	9x6	N		21
40½	52¼	61	86¾	Auto-Lite		12	(23)		2	2		3.2	3.2	16	25	Y	10½x6	9x6	N		22
50½	52¼	69½	96¾	Auto-Lite		12	(23)		2	2		3.1	3.1	10	25	Y	10½x6	9x6	N		23
56½	52¼	73½	102¾	Auto-Lite		12	(23)		2	2		3.0	3.0	9	25	Y	10½x6	9x6	N		24
82½	52¼	76	108¾	Auto-Lite		12	(23)		2	2		2.9	2.9	11½	25	Y	10½x6	9x6	N		25
74½	52¾	85	121¾	Auto-Lite		12	(23)		2	2		2.9	2.9	10	25	Y	10½x6	9x6	N		26
69	50	61	69	General Electric		12	(26)		3	3		3.8	3.8	26	25	Y	10½x6	4x3	N		27
69	50	61	69	General Electric		12	(26)		3	3		3.8	3.8	26	25	Y	10½x6	4x3	N		28
69	50	61	69	General Electric		12	(26)		3	3		3.8	3.8	26	25	Y	10½x6	3¼x5	N		29
69	50	61	69	General Electric		12	(26)		3	3		3.8	3.8	26	25	Y	10½x6	6x5	N		30
66	49		65	General Electric		12	(23)		2	2		2.9	2.9	9	30	Y	10½x6	4x3			31
63	49		63	General Electric		12	(23)		2	2		2.9	2.9	9	30	Y	10½x6	3¼x5			32
63	49		63	General Electric		12	(23)		2	2		2.9	2.9	9	30	Y	10½x6	6x5			33
		64¼•	93¾•				(27)		2	2		2.0	2.0	15			10x3	3¼x2½			34
							(27)		2	2											35
		62•	83¾•			12	(28)		2	2				15			6x2½	3¼x2½			36
		62•	83¾•			12	(28)		2	2				15			6x2½	3¼x2½			37
		64	92	Baldor 183-D	1	12	350		2	2		2.0	2.0	12	12	Opt	10x3½		N		38
		58	96	Baldor 183-D	1	12	350		2	2		2.0	2.0	15	15		10x3½		N		39
		56	87	Baldor 182-D	¾	12	350		2	2		2.0	2.0	15	15		10x3½		N		40
		56	87	Baldor 183-D	1	12	350		2	2		2.0	2.0	15	15		10x3½		N		41
95	9	91		Chry					3	1	Fr	10.0	10.0				22x7x16	15½x6x10			42
60	4	60	60	Baldor 183-D	1	12	400		(46)	(46)	N	4.0	4.0	24	48	Y	10½x7	7x5	Y	500	43
60	4	60	60	Baldor 183-D	1	12	400		(46)	(46)	N	4.0	4.0	24	48	Y	10½x7	7x5	Y	500	44
				Baldor 183-D	1	12	(29)		(30)	(30)	N	4.0	4.0	24	48	Y	10½x7	6–10x5	Opt	500	45
60		57½		Own			(31)	(32)		3	3		5.1	5.1	26	42	Y	17¾x6	10½x5	Y		46
66½		59		Own			(31)	450		3	3		4.9	4.9	26	42	Y	17¾x6	10½x5	Y		47
70		62		Own			(31)	450		3	3		4.9	4.9	26	42	Y	18x7	10x5	Y		48
79		70		Own			36	(33)		4	4		5.5	5.5	27	40	Y	21x7	15½x6	Y		49
85		72		Own			(4)	(33)		4	4		4.8	4.8	22	35	Y	22x7	15x6	Y		50
91		75		Own			36	(33)		4	4		4.8	4.8	22	35	Y	22x8	15x7	Y		51
Sp				Own			(31)	(34)					4.3		16		Y	16x4	6½x5			52
				Own			(31)	(34)					4.3		16		Y	16x4	6½x4½			53
				Own			(31)	(34)					4.3		16		Y	16x4	6½x5			54
				Own			(31)	(34)					4.3		16		Y	16x4	6½x4½			55
				Own			36	(33)					4.5		13		Y	20x4	10½x5			56
				Own			36	(33)					4.5		13		Y	20x4	10½x5			57
				Own			36	(33)					4.5		11		Y	20x5	10½x6			58
				Own			36	(33)					4.5		11		Y	20x5	10½x6			59
				Own			36	(33)					4.0		10		Y	20x6	10½x6			60
84		73		Own			36	(13)		4	4		5.3	5.3	22	45	Y	21x8	15½x6			61
Sp																					
N	N	61	70	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		62
N	N	61	70	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	20	Var	Y	10x5	10x5	N		63
N	N	61	70	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		64
N	N	60	71	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		65
N	N	64	82	GE BT-13-22A57	1½	12	800	N	3	3	N	3.5	3.5	20	Var	Y	10x5	10x5	N		66
N	N	60	78	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		67
N	N	61	79	GE BT-13-22A57	1½	12	800	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		68
N	N	58	74	GE BT-13-22A57	1½	12	800	N	3	3	N	3.5	3.5	20	Var	Y	10x5	10x5	N		69
N	N	56	72	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		70
N	N	56	72	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		71
N	N	58	74	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	20	Var	Y	10x5	10x5	N		72
N	N	60	71	GE BT-13-22A57	1½	12	600	N	3	3	N	3.5	3.5	25	Var	Y	10x5	10x5	N		73
		Var	Var	Auto-Lite		12						2.5	2.5	10	10	Y	12x3½				74
		Var	(48)	Auto-Lite		12						2.5	2.5	10	10	Y	12x3½				75
		Var	Var	Auto-Lite		12						2.5	2.5	10	10	Y	12x3½				76
86¼	0					31		Conv	3	3	Fr	18.0	18.0	45	45		7.50/10	7.50/10			77
86¼	0					31		Conv	3	3	Fr	18.0	18.0	45	45		7.50/10	7.50/10			78
105	12	92				68		Conv	4	4	Fr	14.5	14.5	35	35		7.50/15	7.50/15			79
133		123				72		Conv	4	4	Fr	25.0	25.0	35	35		8.25/18	8.25/18			80
133		123				72		Conv	4	4	Fr	25.0	25.0	35	35		7.50/18	7.50/18			81

For Abbreviations and References see pages 96 and 97

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (In.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	OVERALL DIMENSIONS: Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Under-clearance: At Truck Center	Height: Under-clearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Overall—Including Carriage in Raised Position
	Ross—(Continued)																									
1	10M	10000	24	13700	S	Fk	Hyd	N	12	4	90	67	48•	146	42†				6	110	170	167	287	120	240	
2	15LH	18000	26	18500	S	Fk	Hyd	N	12	4	126	68½	48•	185½	42†				6	110	170	170	290	120	240	
3	15LL	15000	27	17300	S	Fk	Hyd	N	12	4	126	68½	48•	185½	42†				6	110	170	170	290	120	240	
4	15SH	15000	25	18000	S	Fk	Hyd	N	12	4	106	68½	48•	165½	42†				6	110	170	170	290	120	240	
5	15SL	13200	25	16800	S	Fk	Hyd	N	12	4	108	68½	48•	165½	42†				6	110	170	170	290	120	240	
6	2024	20000	24	20700	S	Fk	Hyd	N	12	4	120	69	48•	185½	42†					110	170	170	290	120	240	
7	2636	26000	36	31000	S	Fk	Hyd	N	12	4	148½	106	84•	224½	72†					176	268			120	206	
8	Silent Hoist FK5		24	14500	S	Fk	Hyd	Y	12	4	108	23½	24	150	42	72	16	9		108	162	168	270	120	216	
9	FK7½		24	19000	S	Fk	Hyd	Y	12	4	108	25	24	160	51	96	16	9		108	162	168	270	120	216	
10	FK10		24	20000	S	Fk	Hyd	Y	12	4	132	26	24	190	51	120	16	9		120	174	180	282	120	216	
11	FK15		30	30000	S	Fk	Hyd	Y	12	4	148	32	30	226	72	120	16	9		120	153	180	243	120	180	
12	Towmotor LT-35	1500	15	3095+	Ss	Fk	Hyd	Y	10	3½	35	11½	15†	60¼	30†		5	2⅝	25½•	65†	83†	89†	137†	73¼†	121¼†	140¼•
13	LT-35	2000	15	3405+	Ss	Fk	Hyd	Y	10	3½	35	11½	15†	60¼	30†		5	2⅝	25½•	65†	83†	89†	137†	73¼†	121¼†	140¼•
14	LT-35	2000	15	4130+	Ss	Fk	Hyd	Y	10	3½	35	11½	24†	61¾	30†		5	2⅝	25½•	65†	83†	89†	137†	73¼†	121¼†	140¼•
15	390	3000	24	4835+	S	Fk	Hyd	Y	10	3½	39	12½	15†	71¼	30†		8⅜	2¾	25½•	65†	101†	89†	161†	73½†	145½†	164•
16	420	4000	24	5500+	S	Fk	Hyd	Y	10	3½	42	12½	15†	74¼	36†		7	2¾	25½•	65†	101†	89†	161†	73½†	145½†	164•
17	460	4000	24	6210+	S	Fk	Hyd	Y	10	3½	46	12½	24†	78¼	36†		7¼	2¾	25½•	65†	101†	89†	161†	73½†	145½†	164•
18	400-P	2000	15	4510+	S	Fk	Hyd	Y	12	3	40	15½	24†	74	30†		7⅛	4¾	21½•	65†	83†	91†	139†	73½†	121½†	140•
19	500	5000	24	7235+	S	Fk	Hyd	Y	10	4	50	12¾	24†	82½	36†		7⅛	2¾	25¾•	65†	101†	89†	161†	73¾†	145¾†	164•
20	500-P	4000	24	6895+	S	Fk	Hyd	Y	10	4	50	18½	24†	88⅝	36†		9⅛	4¾	25¾•	67†	85†	91†	139†	73¾†	121¾†	140¼•
21	LT-60	4000	24	7405+	S	Fk	Hyd	Y	10	5	60	20¾	24†	106½	42†		12½	9	13•	69†	87†	104½†	140½†	73½†	109½†	147•
22	LT-60	5000	24	8025+	S	Fk	Hyd	Y	10	5	60	20¾	24†	106½	42†		12½	9	13•	69†	87†	104½†	140½†	73½†	109½†	147•
23	LT-60	6000	24	8965+	S	Fk	Hyd	Y	10	5	60	20¾	24†	106½	42†		12½	9	13•	69†	87†	104½†	140½†	73½†	109½†	147•
24	LT-50	5000	24	7530+	S	Fk	Hyd	Y	10	3½	50	15	20†	88	36†		7	4½	20½•	65†	104†	99¾†	171¾†	73½†	145½†	178•
25	LT-56	6000	24	8415+	S	Fk	Hyd	Y	10	3½	56	15	24†	94	42†		8	4½	20½•	65†	104†	99¾†	171¾†	73½†	145½†	178•
26	LT-62	7000	24	9420+	S	Fk	Hyd	Y	10	3½	62	16	24†	101	42†		8¾	4½	20½•	67†	106†	104½†	176½†	73¾†	145¼†	178•
27	LT-72	10000	24	12080+	S	Fk	Hyd	Y	10	5	72	16⅜	24†	111½	42†		8¾	3½	17½•	71†	86†	106½†	136½†	76†	106†	138•
28	LT-90	15000	36	16300+	S	Fk	Hyd	Y	10	3	90	20	24†	134	42†		8	3	22•	80†	95†	117⅜†	147⅜†	76¼†	106¼†	148•
29	Transitier 100	1000	15	2200	S	Fk	Hyd	Y	10	4	44	14	15	70	30	48	4	4	8½	54	78	80	128	60	180	128
30	200	2000	15	3100	S	Fk	Hyd	Y	10	4	44	14	15	70	30	48	4	4	8	54	78	80	128	60	180	128
31	250	2000	24	3600	S	Fk	Hyd	Y	10	4	44	14	24	74	30	48	4	4	8	54	78	80	128	60	180	128
32	300	3000	15	4400	S	Fk	Hyd	Y	10	4	44	15	15	74	30	48	4	4	10	56	82	84	132	60	180	132
33	200W	2000	15	3300	S	Fk	Hyd	Y	10	4	44	14	15	70	30	48	4	4	8	54	78	80	128	Sp	Sp	128
34	250W	2000	24	3700	S	Fk	Hyd	Y	10	4	44	14	24	70	30	48	4	4	8	54	78	80	128	Sp	Sp	128
35	300W	3000	15	4500	S	Fk	Hyd	Y	10	4	44	15	15	74	30	48	4	4	10	56	82	84	132	Sp	Sp	132
36	400	4000	24	6500	S	Fk	Hyd	Y	14	4	54	18½	24	95	30	54	5	4½	72•	63	95	107	167	84	144	144
37	500	5000	24	7500	S	Fk	Hyd	Y	14	4	54	18½	24	98	30	54	5	4½	72•	63	95	107	167	84	144	144
38	Yale & Towne KG51AT-J10	1000	24	3065	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†		5	2½	12¾	60	68	105½	121½	92	108	129
39	KG51AT-10	1000	24	3135	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†		5	2½	18¾	72	90	126½	162½	104	146	167
40	KG51T-J10	1000	24	3065	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†		5	2½	47	60	68	105½	121½	92	108	129
41	KG51T-10	1000	24	3135	S	Fk	Hyd	Y	10	3	38½	11¼	24•	58¼	36†		5	2½	69	72	90	126½	162½	104	146	167
42	KG51AT-J15	1000	24	3700	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†		5	2½	13¼	60	68	105½	121½	92	108	129
43	KG51AT-15	1500	24	3770	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†		5	2½	19¼	72	90	126¼	162¼	110	146	167
44	KG51T-J15	1500	24	3700	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†		5	2½	47	60	68	105¼	121¼	92	108	129
45	KG51T-15	1500	24	3770	S	Fk	Hyd	Y	10	3	38½	11¾	24•	62	36†		5	2½	69	72	90	126¼	162¼	110	146	167
46	KG51AT-30	3000	24	6550	S	Fk	Hyd	Y	11½	6½	47	15½	24•	77¾	36†		5¾	2⅞	17	68	90	117	161	100	144	178
47	KG51T-30	3000	24	6550	S	Fk	Hyd	Y	11½	6½	47	15½	24•	77¾	36†		5¾	2⅞	64	68	90	117	161	100	144	178
48	KG51AT-40	4000	24	7150	S	Fk	Hyd	Y	11½	6½	47	15½	24•	80½	36†		5¾	2⅞	17	68	90	117	161	100	144	178
49	KG51T-40	4000	24	7150	S	Fk	Hyd	Y	11½	6½	47	15½	24•	80½	36†		5¾	2⅞	64	68	90	117	161	100	144	178
50	KGP51AT-40	4000	24	7525	S	Fk	Hyd	Y	11½	5	63	21	24•	103	36†		9¼	4¾	17	70	92	119	163	100	144	178
51	KGP51T-40	4000	24	7525	S	Fk	Hyd	Y	11½	5	63	21	24•	103	36†		9¼	4¾	64	70	92	119	163	100	144	178
52	KG51AT-50	5000	24	7950	S	Fk	Hyd	Y	11½	6½	47	15¾	24•	83¾	36†		5¾	2⅞	17	68	90	117	161	100	144	178
53	KG51T-50	5000	24	7950	S	Fk	Hyd	Y	11½	6½	47	15¾	24•	83¾	36†		5¾	2⅞	64	68	90	117	161	100	144	178
54	KG51AT-60	6000	24	8750	S	Fk	Hyd	Y	11½	6½	50	15¾	24•	86¾	36†		5¾	2⅞	17	68	90	117	161	100	144	178
55	KG51T-60	6000	24	8750	S	Fk	Hyd	Y	11½	6½	50	15¾	24•	86¾	36†		5¾	2⅞	64	68	90	117	161	100	144	178
56	KGP51AT-60	6000	24	9300	S	Fk	Hyd	Y	11½	5	68	21	24•	109¾	36†		9¼	4¾	17	70	92	119	163	100	144	178
57	KGP51T-60	6000	24	9300	S	Fk	Hyd	Y	11½	5	68	21	24•	109¾	36†		9¼	4¾	64	70	92	119	163	100	144	178
58	KGS51AT-60	6000	24	9050	S	Fk	Hyd	Y	8	3	55	16¼	24•	92½	36†		6¼	3	17	68	90	117	161	100	144	178
59	KG51AT-70	7000	24	9600	S	Fk	Hyd	Y	11½	6½	50	15¾	24•	89¼	36†		5¾	3	22	68	90	111	155	88	132	178
60	KGS51AT-70	7000	24	9075	S	Fk	Hyd	Y	8	3	62	16¼	24•	99¼	36†		6¼	3	22	68	90	111	155	88	132	178
61	KGP51AT-70	7000	24	10000	S	Fk	Hyd	Y	11½	5	68	21	24•	113	36†		9¼	4¾	22	70	92	113	157	88	132	166
62	KG51AT-80	8000	24	10200	S	Fk	Hyd	Y	11½	6½	55	16¼	24•	99¾	36†		6¼	3	22	68	90	111	155	88	132	178
63	KGP51AT-80	8000	24	11000	S	Fk	Hyd	Y	11½	5	68	21	24•	113	36†		9¼	4¾	22	70	92	113	157	88	132	166
64	KG51AT-100	10000	24	13300	S	Fk	Hyd	Y	11	5	62	17⅜	24•	105½	42†		6¼	3	26	83	90	136⅞	150⅞	110	124	161¼
65	KS1AT-J10	1000	24	2010	S	Fk	Hyd	Y	10	3	36⅜	11¼	24•	57⅝	36†		5	2½	11	60	68	105½	121½	92	108	129
66	K51AT-10	1000	24	2080	S	Fk	Hyd	Y	10	3	36⅜	11¼	24•	57⅜	36†		5	2½	17	72	90	126½	162½	110	146	167
67	K51T-J10	1000	24	2060	S	Fk	Hyd	Y	10	3	36⅜	11¼	24•	57⅜	36†		5	2½	47	60	68	105½	121½	92	108	129
68	K51T-10	1000	24	2140	S	Fk	Hyd	Y	10	3	36⅜	11¼	24•	57⅜	36†		5	2½	69	72	90	126½	162½	110	146	167
69	K51AT-J15	1500	24	2350	S	Fk	Hyd	Y	10	3	36⅜	11⅜	24•	57⅜	36†		5	2½	11	60	68	105½	121½	92	108	129
70	K51AT-15	1500	24	2120	S	Fk	Hyd	Y	10	3	41¼	11⅜	24•	62⅝	36†		5	2½	17	72	90	126½	162½	110	146	167
71	K51T-J15	1500	24	2400	S	Fk	Hyd	Y	10	3	36⅜	11⅜	24•	57⅜	36†		5	2½	47	60	68	105½	121½	92	108	129
72	K51T-15	1500	24	2180	S	Fk	Hyd	Y	10	3	41¼	11⅜	24•	62⅝	36†		5	2½	69	72	90	126½	162½	110	146	167
73	K51AT-J20	2000	24	2990	S	Fk	Hyd	Y	10	3	36⅜	11⅜	24•	59½	36†		5	2½	11	60	68	105½	121½	92	108	129
74	K51AT-20	2000	24	2450	S	Fk	Hyd	Y	10	3	41¼	11⅜	24•	62⅝	36†		5	2½	17	72	90	126½	162½	110	146	167
75	K51T-J20	2000	24	3040	S	Fk	Hyd	Y	10	3	36⅜	11⅜	24•	59½	36†		5	2½	47	60	68	105½	121½	92	108	129
76	K51T-20	2000	24	2510	S	Fk	Hyd	Y	10	3	41¼	11⅜	24•	62⅝	36†		5	2½	69	72	90	126½	162½	110	146	167
77	K51AT-30X	3000	24	3650	S	Fk	Hyd	Y	10	3	45⅜	13¼	24•	70⅜	36†		5	2½	21	68	90	117	161	100	144	165
78	K51AT-30	3000	24	4680	S	Fk	Hyd	Y	10	3	44	15½	24•	73¼	36†		5¾	2⅞	17	68	90	117	161	100	144	178
79	K51T-30X	3000	24	3730	S	Fk	Hyd	Y	10	3	45⅜	13¼	24•	70⅜	36†		5	2½	69	68	90	117	161	100	144	165
80	K51T30	3000	24	4680	S	Fk	Hyd	Y	11½	6½	44	15½	24•	73¼	36†		5¾	2⅞	64	68	90	117	161	100	144	178
81	K51AT4015X	4000	15	3860	S	Fk	Hyd	Y	10	3	45⅜	13¼	15•	70⅜	36†		5	2½	21	68	90	117	161	100	144	165
82	K51AT4015	4000	15	4870	S	Fk	Hyd	Y	11½	6½	44	15½	15•	73¼	36†		5¾	2⅞	17	68	90	117	161	100	144	178
83	K51T4015X	4000	15	3860	S	Fk	Hyd	Y	10	3	45⅜	13¼	15•	70⅜	36†		5	2½	69	68	90	117	161	100	144	165
84	K51T4015	4000	15	4870	S	Fk	Hyd	Y	11½	6½	44	15½	15•	73¼	36†		5¾	2⅞	64	68	90	117	161	100	144	178
85	K51AT40	4000	24	5480	S	Fk	Hyd	Y	11½	6½	44	15½	24•	74½	36†		5¾	2⅞	17	68	90	117	161	100	144	178
86	K51T40	4000	24	5480	S	Fk	Hyd	Y	11½	6½	44	15½	24•	74½	36†		5¾	2⅞	64	68	90	117	161	100	144	178

For Abbreviations and References see pages 96 and 97

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
												Truck									
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Forward (mph)	Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
133		123			72			Conv	4	4	Fr	25.0	25.0	35	35		7.50/18	7.50/18			1
175		158			75			Conv	4	4	Fr	25.0	25.0	35	35		9.00/18	9.00/18			2
175		158			75			Conv	4	4	Fr	25.0	25.0	35	35		9.00/18	9.00/18			3
152		141			75			Conv	4	4	Fr	25.0	25.0	35	35		9.00/18	9.00/18			4
152		141			75			Conv	4	4	Fr	25.0	25.0	35	35		9.00/18	9.00/18			5
180					112			Conv	4	4	Fr	18.0	18.0	40	Var		9.00/18	9.00/18			6
210					126			Conv	4	4	Fr	18.0	18.0	35	35		14.00/20	14.00/20			7
153	135			(35)	68				4	4	FF	18.0	18.0	35	35	N	7.50/15	7.50/15	Y		8
155	135			(35)	72				4	4	FF	18.0	18.0	35	35	N	8.25/20	9.00/15	Y		9
188	166			(35)	72				4	4	FF	12.0	12.0	20	20	N	9.00/20	9.00/15	Y		10
226				(35)	115				4	4	FF	12.0	12.0	20	20	N	13.00/20	13.00/20	Y		11
58	5	55	109½	Cont N-62	15½			Conv	2	2	Fr	8.0	8.0	35		N	17x4½	13x3½	Y		12
58	5	55	109½	Cont N-62	15½			Conv	2	2	Fr	8.0	8.0	35		N	17x4½	13x3½	Y		13
60½	5	56	112	Cont N-62	15½			Conv	2	2	Fr	8.0	8.0	35		N	17x4½	13x3½	Y		14
68	5	61	120½	Cont (50) Y-112	27½			Conv‡	2	2	Fr	8.0	8.0	37		N	17¾x6	16¼x4	Y		15
71	5½	63½	123½	Cont (51) F-140	37½			Conv‡	2	2	Fr	8.0	8.0	37		N	18x7	16¼x5	Y		16
75	6	65	127½	Cont (51) F-140	37½			Conv‡	2	2	Fr	8.0	8.0	37		N	18x7	16¼x5	Y		17
72	12½	60½	127½	Cont (51) Y-112	27½			Conv‡	2	2	Fr	9.5	9.5	37		N	6.50/10	5.00/8	Y		18
81	10¼	69	141⅜	Cont (51) F-140	37½	6	115	Conv‡	2	2	Fr	8.0	8.0	37		N	18x8	16¼x6	Y		19
86½	15¼	74⅜	153	Cont (51) F-140	37½	6	115	Conv‡	2	2	Fr	10.0	10.0	37		N	7.00/12	6.50/10	Y		20
125	50	87	185¾	Cont (49) F-209	51			Conv‡	2	2	Fr	11.0	11.0	45		N	8.25/15	6.50/10	Y		21
125	50	87	185¾	Cont (49) F-209	54			Conv‡	2	2	Fr	11.0	11.0	45		N	8.25/15	6.50/10	Y		22
136	62	88½	196¾	Cont (49) F-209	54			Conv‡	2	2	Fr	11.0	12.0	45		N	8.25/15	7.50/10	Y		23
90	21	71½	145	Cont F-162	41			Conv‡	2	2	Fr	9.0	12.0	40		N	22x7	17¾x6	Y		24
96	25	75½	151	Cont F-162	41			Conv‡	2	2	Fr	9.0	12.0	40		N	22x8	17¾x6	Y		25
104	29	80	160	Cont (49) F-209	54			Conv‡	2	2	Fr	9.0	10.0	40		N	22x8	18x7	Y		26
115	27	88½	171⅜	Cont F-209	54			Conv‡	2	2	Fr	9.5	11.0	34		N	22x6	18x7	Y		27
145	43	104	205	Cont F-226	60			Conv‡	2	2	Fr	5.5	6.0	26		N	22x8	18x8	Y		28
61		66	118	Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	29
61		66	118	Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	30
64		70	122	Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	31
64		70	122	Aerojet	26			Conv	1	1	Fr	10.0	10.0	45	45	N	6.00/9	6.00/9	Opt	500	32
61		66	118	Wau ICK	18			Conv	1	1	Fr	8.0	8.0	45	45	N	6.00/9	6.00/9	Opt	1000	33
64		70	122	Wau ICK	18			Conv	1	1	Fr	8.0	8.0	45	45	N	6.00/9	6.00/9	Opt	1000	34
64		70	122	Wau ICK	18			Conv	1	1	Fr	8.0	8.0	45	45	N	6.00/9	6.00/9	Opt	1000	35
85	7½	75	145	Wil CJ3A	55			Conv	2	2	Fr	12.0	12.0	55	45	N	7.50/12	6.00/9	Opt	2900	36
85	7½	75	145	Wil CJ3A	55			Conv	2	2	Fr	12.0	12.0	55	45	N	7.50/12	6.00/9	Opt	2900	37
58	5	64	118	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	38
58	5	64	118	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	39
58	5	64	118	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	40
58	5	64	118	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x5x11¼	13x3½x8	Y	1822	41
60	6	64	120	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	42
60	6	64	120	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	43
60	6	64	120	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	44
60	6	64	120	Int U-1	18			Conv	2	2	Fr	7.5	7.5	40	75		16¼x6x11¼	13x4½x8	Y	1812	45
73	6	71	137	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4202	46
73	6	71	137	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4202	47
75	6	72	140	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4195	48
75	6	72	140	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	40	60		21x6x15	16¼x5x11¼	Y	4195	49
75	7½	82	140	Chry 6A-215	65			Conv	2	2	FI	12.5	12.5	40	100		7.50/15	6.50/10	Y	2648	50
75	7½	82	140	Chry 6A-215	65			Conv	2	2	FI	12.5	12.5	40	100		7.50/15	6.50/10	Y	2848	51
79	7	73	142	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	38	60		21x7x15	16¼x6x11¼	Y	4180	52
79	7	73	142	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	38	60		21x7x15	16¼x6x11¼	Y	4180	53
83	8	76	147	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	40	60		21x8x15	16¼x6x11¼	Y	4168	54
83	8	76	147	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	40	60		21x8x15	16¼x6x11¼	Y	4168	55
113	7½	91	182	Chry 6A-215	65			Conv	2	2	FI	12.5	12.5	38	100		7.50/15	7.50/10	Y	2821	56
113	7½	91	182	Chry 6A-215	65			Conv	2	2	FI	12.5	12.5	38	100		7.50/15	7.50/10	Y	2821	57
89	9	78	153	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	38	60		22x9x16	16¼x7x11¼	Y	3965	58
85	8	76	150	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	33	50		21x8x15	16¼x6x11¼	Y	4157	59
89	12	84	164	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	33	50		22x12x16	16¼x7x11¼	Y	3965	60
116	7½	92	185	Chry 6A-215	65			Conv	2	2	FI	12.5	12.5	33	50		7.50/15	7.50/10	Y	2810	61
91	9	80	155	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	30	50		22x9x16	16¼x7x11¼	Y	3950	62
116	7½	94	185	Chry 6A-215	65			Conv	2	2	FI	12.5	12.5	30	50		7.50/15	7.50/10	Y	2795	63
103	12	86	169	Chry 6A-215	65			Conv	2	2	FI	8.5	8.5	25	60		22x12x16	16¼x7x11¼	Y	3905	64
58		64	117	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N		65
58		64	117	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N		66
58		64	117	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N		67
58		64	117	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x5x11¼	13x3½x8	N		68
58		64	118	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		69
62		65	122	OGE		(4)	450	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		70
58		64	118	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		71
62		65	122	OGE		(4)	450	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		72
58		64	118	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		73
62		65	122	OGE		(4)	400	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		74
59		64	119	OGE		(4)	450	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		75
62		65	122	OGE		(4)	450	DR	4	4		6.0	6.0	40	75	Y	16¼x6x11¼	13x4½x8	N		76
70		68	131	OGE		(4)	500	DR	4	4		6.5	6.5	24	48	Y	17¾x6x12⅛	14x4x6	N		77
75		72	139	OGE		36	500	DR	4	4		5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼	Y	5000	78
70		68	131	OGE		(4)	500	DR	4	4		6.5	6.5	24	48	Y	17¾x6x12⅛	14x4½x8	N		79
75		72	139	OGE		36	500	DR	4	4		5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼	Y		80
70		68	131	OGE		(4)	500	DR	4	4		6.5	6.5	24	48	Y	17¾x6x12⅛	14x4½x8			81
75		72	139	OGE		36	500	DR	4	4		5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼			82
70		68	131	OGE		(4)	500	DR	4	4		6.5	6.5	24	48	Y	17¾x6x12⅛	14x4½x8			83
75		72	139	OGE		36	500	DR	4	4		5.0	5.0	24	60	Y	21x6x15	16¼x5x11¼			84
75		72	139	OGE		36	500	DR	4	4		5.0	5.0	23	60	Y	21x6x15	16¼x5x11¼			85
75		72	139	OGE		36	500	DR	4	4		5.0	5.0	23	60	Y	21x6x15	16¼x5x11¼			86

For Abbreviations and References see pages 96 and 97

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (In.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	OVERALL DIMENSIONS: Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Height: Overall—Including Carriage or Backguard
	Yale & Towne (Continued)																									
1	K51AT50	5000	24	5750	S	Fk	Hyd	Y	11½	6½	48	15¼	24•	81	36†		5¾	2⅞	17	68	90	117	161	100	144	178
2	K51T50	5000	24	5750	S	Fk	Hyd	Y	11½	6½	48	15¾	24•	81	36†		5¾	2⅞	64	68	90	117	161	100	144	178
3	K51AT60	6000	24	6250	S	Fk	Hyd	Y	11½	6½	48	15¾	24•	81	36†		5¾	2⅞	17	68	90	117	161	100	144	178
4	K51AT70	7000	24	6860	S	Fk	Hyd	Y	11½	6½	51	15¾	24•	85	36†		5¾	3	22	68	90	111	155	88	132	166
5	K51AT80	8000	24	6970	S	Fk	Hyd	Y	11½	6½	54	16¼	24•	90¾	36†		6¼	3	22	68	90	111	155	88	132	166
6	K51AT100	10000	24	10660	S	Fk	Hyd	Y	11	5	61	17¾	24•	95	42†		6¼	3	30	83	90	136⅞	150⅞	110	124	161¼
7	K33GH50	50000	SA		St	Ptf	Ch	N	N	N	117½						6	6	52	112†		112†		75†		112†
8	K41-4	4000	24		St	Fk	Ch	Y	10	5	50	14⅝	24•	76½	36†		4½		63	68	83			89	119	153
9	K41-5	5000	24		St	Fk	Ch	Y	8	2	52½	15	24•	81¼	36†		4½		63	68	83			89	119	153
10	K41-6	6000	24		St	Fk	Ch	Y	8	2	52½	15¾	24•	82	36†		5½		62	68	83			88	118	152
11	K41-7	7000	24		St	Fk	Ch	Y	8	2	56	15¾	24•	86¾	36†		5½		62	68	83			88	118	152
12	K41-8	8000	24		St	Fk	Ch	Y	8	3	60	15¾	24•	90¾	42†		5½		58	83†				107†		141
13	K41-10	10000	24		St	Fk	Ch	Y	8	2	67	20¼	30•	105¼	36†		4½		65	96†				110†		146
14	K41-12	12000	36		St	Fk	Ch	Y	8	2	67	20¼	24•	105¼	36†		4½		65	96†				110†		146
15	K41-12	12000	36		St	Fk	Ch	N	5	2	75	18¾	30•	113¼	48†		4		58	96†				58†		96
16	K41-14	14000	36		St	Fk	Ch	N	5	2	75	18¾	36•	113¼	48†		4		58	96†				58†		96
17	K41-15	15000	36		St	Fk	Ch	N	5	2	75	18¾	36•	113¼	48†		4	4	58	96†				58†		96
18	K41-16	16000	36		St	Fk	Ch	N	5	2	86	18	39•	123	48†		4	4	54	96†				54†		96
19	K41-18	18000	36		St	Fk	Ch	N	5	2	86	18	39•	123	48†		4	4	54	96†				54†		96
20	K51-200	20000	36		St	Fk	Hyd	N			106	27	48•	151½			12	12	76	148†				76†		150
21	K51-250	25000	SA		St	Fk	Hyd	N			106	27	48•	151½			12	12	76	148†				76†		150
22	K51-300	30000	48		St	Fk	Hyd	N	N	N	106	27	48•	152			12	12	76	148†				76†		150
23	K51-400	40000	48		St	Fk	Hyd	N	N	N	106	27	48•	157			12	12	72	148†				72†		150
24	K51-500	50000	48		St	Fk	Hyd	N	N	N	110	29	48•	169			12	12	61	148†				61†		150
25	K51-600	60000	48		St	Fk	Hyd	N	N	N	110	29	48•	173			12	12	61	148†				61†		150
26	K51-800	80000	48		St	Fk	Hyd	N	N	N	110	29	30•	173			12	12	61	148†				61†		150
27	KM4H	4000	24	2510	St	Ptf	Ch	Y	N	N	(36)						2¼	2¼	61	68	83	68	139	46	115	139
28	K22-4	4000	24	3800	St	Ptf	Ch	Y	N	N	61						3⅝	3⅝	51	68	83	68		47	113	
29	K25-6	6000	24	4735	St	Ptf	Ch	Y	N	N	64						3⅝	3⅝	62		83†				113†	
30	K25H-6	6000	24	4850	St	Ptf	Ch	Y	N	N	64						4	4	67		83†				118†	
31	K33-10	10000	24	6380	St	Ptf	Ch	Y			(37)						3⅝		57							
32	K33H-12	12000	36	7600	St	Ptf	Ch	N	N	N	(38)						3½	3½	63	83†				63†		84
33	K33SH-16	16000	36	8100	St	Ptf	Ch	N	N	N	(39)						3½	3½	56	83†				56†		84
34	K33GH20	20000	36		St	Ptf	Ch	N	N	N	(40)								72							
35	K33GH30	30000	SA		St	Ptf	Ch	N	N	N	108								75							
36	K33GH40	40000	SA		St	Ptf	Ch	N	N	N	117½								75							
37	M10HF	1000	15	1755	W	Fk	Hyd	N	N	N	28⅜	6¼	8•	44¼	24†		2½	3	54½	68	83			46	60	89
38	M15HF	1500	15	2081	W	Fk	Hyd	N	N	N	28⅜	6¼	10•	48¼	24†		2½	3	54½	68	83			46	60	89
39	M15HTF	1500	15	2780	W	Fk	Hyd	N	10	2	42	6¾	24•	57⅛	30†		2½	3	54	68	83			46	60	89
40	M15TTF	1500	15	3155	W	Fk	Hyd	Y	10	2	42	6¾	24•	57⅛	30†		2½	3	60¾	68	83	112¼	142¼	90	120	149
41	M20HTF	2000	24	2805	W	Fk	Hyd	N	18	2	48	6¾	24•	63¾	30†		2½	3	54	68	83	68	83	46	60	89
42	M20TTF	2000	24	3180	W	Fk	Hyd	Y	18	2	48	6¾	24•	63¾	30†		2½	3	60¾	68	83	112¼	142¼	90	120	149
43	M25HTF	2500	24	3105	W	Fk	Hyd	N	18	2	48	6¾	24•	67¾	30†		2½	3	54	68	83	68	83	46	60	89
44	M25TTF	2500	24	3480	W	Fk	Hyd	Y	18	2	48	6¾	24•	67¾	30†		2½	3	60¾	68	83	112¼	142¼	90	120	149
45	M30HTF	3000	24	3430	W	Fk	Hyd	N	18	2	57	7¼	24•	77	30†		2½	3	54	68	83	68	83	43¼	58¼	87½
46	M30TTF	3000	24	3805	W	Fk	Hyd	Y	18	2	57	7¼	24•	77	30†		2½	3	57½	68	83	108¾	138¾	83¼	113¼	142½
47	M30SF	3000	24		W	Fk	Hyd	N	N	N	49¼		24•	34⅞	36†		1½	2¼	54	68	83			49	64	90
48	M30STF	3000	24		W	Fk	Hyd	Y	N	N	49¼		24•	34⅞	36†		1½	2¼	19	68	83	113	143	93½	123½	152½
49	M40SF	4000	24		W	Fk	Hyd	N	N	N	61¾		24•	38	42†		1½	2	54	68	83			48½	63½	90
50	M40STF	4000	24		W	Fk	Hyd	Y	N	N	61¾		24•	38	42†		1½	2	61	68	83	113	143	91	121	150
51	M4HL7	4000	24	1780	W	Ptf	Hyd	N	N	N	(41)		30•				1⅞	1⅞		66½	83			50	66½	83
52	M4HL11	4000	24	1780	W	Ptf	Hyd	N	N	N	(41)		30•				2½	2½		66½	83			54	70½	83
53	M25HLP	2500	24	1320	W	Fk	Hyd	N	N	N	(42)		21•	39	36	42	1⅝	1⅝	66	68	83			51	66	83
54	M30HLT	3000	24	2875	W	Ptf	Hyd	Y	N	N	(43)		30•				2	2	27	68	83			93	123	142
55	M40HLT	4000	24	3025	W	Ptf	Hyd	Y	N	N	(44)		30•				2	2	27	68	83			93	123	142
56	RSA-2	2000	15	2400	St	Fk	Hyd	N	N	N	(45)	20¾	24•	29¾			1½	1½		60	90			46½	76½	
57	RSAT-2	2000	15	2600	St	Fk	Hyd	Y	N	N	(45)	20¾	24•	29¾			1½	1½	21	60	90	110½	170½	87	147	176
58	RST-2	2000	15	2670	St	Fk	Hyd	Y	N	N	(45)	20¾	24•	29¾			1½	1½	53	60	90	110½	170½	87	147	176
59	RSA-3	3000	24	2450	St	Fk	Hyd	N	N	N	(45)	20¾	24•	29¾			1½	1½		60	90			46½	76½	
60	RSAT-3	3000	24	2650	St	Fk	Hyd	Y	N	N	(45)	20¾	24•	29¾			1½	1½		60	90	110½	170½	87	147	176
61	RST-3	3000	24	2720	St	Fk	Hyd	Y	N	N	(45)	20¾	24•	29¾			1½	1½	53	60	90	110½	170½	87	147	176
62	G52-2024	2000	15	4125	S	Fk	Hyd	Y	10	5	43¼	12¼	24•	70½	30†		4¾	2½	21	60	90	105	165	84	144	185
63	G52T-2024	2000	15	4125	S	Fk	Hyd	Y	10	5	43¼	12¼	24•	70½	30†		4¾	2½	62	60	90	105	165	84	144	185
64	G52-3024	3000	24	4735	S	Fk	Hyd	Y	10	5	43¼	13	24•	73⅜	30†		5¼	2½	21	60	90	105	165	84	144	185
65	G52T-3024	3000	24	4735	S	Fk	Hyd	Y	10	5	43¼	13	24•	73⅜	30†		5¼	2½	62	60	90	105	165	84	144	185
66	G52-4015	4000	15	4735	S	Fk	Hyd	Y	10	5	43¼	13	15•	73⅜	30†		5¼	2½	21	60	90	105	165	84	144	185
67	G52T-4015	4000	15	4735	S	Fk	Hyd	Y	10	5	43¼	13	15•	73⅜	30†		5¼	2½	62	60	90	105	165	84	144	185
68	GP52-2024	2000	15	4425	S	Fk	Hyd	Y	10	5	44	14½	24•	72¾	30†		7⅛	4½	21	60	90	100½	160½	80	140	180½
69	GP52V-2024	2000	15	4425	S	Fk	Hyd	Y	10	5	44	14½	24•	72¾	30†		7⅛	4½	48	60	90	100½	160½	80	140	180½
70	K53AT-2024	2000	15	3000	S	Fk	Hyd	Y	10	5	50	12¼	24•	71¾	30†		5		21	68	83	121	151	100	130	151
71	K53T-2024	2000	15	3000	S	Fk	Hyd	Y	10	5	50	12¼	24•	71¾	30†		5		62	68	83	121	151	100	130	151
72	K46T-2024	2000	15	3400	S	Fk	Hyd	Y	10	5	46	12¼	24•	65½	30†		4½		62	68	83	120½	150½	100	130	150½
73	K46AT-3024	3000	24	3550	S	Fk	Hyd	Y	10	5	46	13	24•	67¾	30†		4½		21	68	83	120½	150½	100	130	150½
74	K46T-3024	3000	24	3550	S	Fk	Hyd	Y	10	5	46	13	24•	67¾	30†		4½		62	68	83	120½	150½	100	130	150½
75	K46AT-4015	4000	24	3550	S	Fk	Hyd	Y	10	5	46	13	24•	67¾	30†		4½		21	68	83	120½	150½	100	130	150½
76	K46T-4015	4000	24	3550	S	Fk	Hyd	Y	10	5	46	13	24•	67¾	30†		4½		62	68	83	120½	150½	100	130	150½
77	K53AT-3024	3000	24	3150	S	Fk	Hyd	Y	10	5	50	13	24•	73¾	30†		5½		21	68	83	121	151	100	130	151
78	K53T-3024	3000	24	3150	S	Fk	Hyd	Y	10	5	50	13	24•	73¾	30†		5½		62	68	83	121	151	100	130	151
79	K53AT-4015	4000	15	3150	S	Fk	Hyd	Y	10	5	50	13	15•	73¾	30†		5½		21	68	83	121	151	100	130	151
80	K53T-4015	4000	15	3150	S	Fk	Hyd	Y	10	5	50	13	15•	73¾	30†		5½		62	68	83	121	151	100	130	151
81	K46AT-2024	2000	15	3400	St	Fk	Hyd	Y	10	5	46	12¼	24•	65½	30†		4½		21	68	83	120½	150½	100	130	150½
82	M10ATF	1000	15		W	Fk	Hyd	Y	7	2	31⅛	6¼	24•	47	30†		2¾	2¾	18	68	90	124	168	100	144	188
83	M15ATF	1500	15	3155	W	Fk	Hyd	Y	10	2	42	6¾	24•	57¾	30†		2½	2½	18	68	90	124	168	100	144	188
84	M20ATF	2000	15	3180	W	Fk	Hyd	Y	18	2	48	6¾	24•	63¾	30†		2½	2½	18	68	90	124	168	100	144	188
85	M25ATF	2500	24	3480	W	Fk	Hyd	Y	18	2	51	6¾	24•	66¾	30†		2½	2½	18	68	90	124	168	100	144	188
86	M30ATF	3000	24	3805	W	Fk	Hyd	Y	18	2	60	7¼	24•	76	30†		2½	2½	18	68	90	124	168	100	144	188
87	M30HLTP	3000	24	2590	W	Fk	Hyd	Y			67⅜		21•	45¼	42†		1⅝	1⅝	22	68	83	112	142	90	120	142
88	M40HLTP	4000	24	2740	W	Fk	Hyd	Y			67⅜		21•	45¼	42†		1⅝	1⅝	22	68	83	112	142	90	120	142
89	KM31A-4	4000	24	5500	St	Fk	Hyd	Y	10	3	47	15	24•	95	36†		5¾		55	68	83	123	153	89	119	153

For Abbreviations and References see pages 96 and 97

OR PLATFORM TRUCKS—*continued*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
												Truck									
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Forward (mph)	Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
178																					
178																					
82		75	146	OGE		36	650	DR	4	4		5.0	5.0	22	60	Y	21x7x15	16¼x8x11¼			1
82		75	146	OGE		36	650	DR	4	4		5.0	5.0	22	60	Y	21x7x15	18¼x8x11¼			2
84		76	148	OGE		36	650	DR	4	4		5.0	5.0	21	60	Y	21x8x15	16¼x8x11¼			3
86		77	150	OGE		36	700	DR	4	4		5.0	5.0	16	50	Y	21x8x15	16¼x8x11¼			4
91		81	156	OGE		36	700	DR	4	4		5.0	5.0	15	50	Y	22x9x16	16¼x7x11¼			5
91		84	157	OGE		36	800	DR	4	4		5.0	5.0	12	50	Y	22x12x16	16¼x7x11¼			6
151		122	189	Electric Specialty				DR	4	4						Y	22x14	22x14			7
73	23	72	136	Electric Specialty				DR	4	4		5.0	5.0	21	45	Y	20x6	15x5			8
84	27	75	147	Electric Specialty				DR	4	4		6.0	6.0	20	45	Y	20x7x16	15x8x11¼			9
85	25	77	148	Electric Specialty				DR	4	4		5.0	5.0	13	28	Y	22x8x16	15x8x11¼			10
87	28	80	153	Electric Specialty				DR	4	4		5.0	5.0	12	28	Y	22x8x16	15x8x11¼			11
94	32	82	158	Electric Specialty				DR	4	4		5.0	5.0	12	30	Y	22x10x16	15x7x11¼			12
104	33	93	174	Electric Specialty				DR	4	4		5.0	5.0	10	16	Y	22x14	15x9			13
104	33	93	174	Electric Specialty				DR	4	4		5.0	5.0	10	16	Y	22x14	15x9			14
108	32	97	175	Electric Specialty				DR	4	4		4.5	4.5	8	12	Y	22x16	22x10			15
108	32	97	173	Electric Specialty				DR	4	4		4.5	4.5	8	12	Y	22x16	22x10			16
108	3	97	175	Electric Specialty				DR	4	4		4.5	4.5	8	12	Y	22x16	22x10	N		17
119	4	104	185	Electric Specialty				DR	4	4		4.5	4.5	6	10	Y	22x18	22x10	N		18
119	4	104	185	Electric Specialty				DR	4	4		4.5	4.5	6	10	Y	22x18	22x10	N		19
154	3	135	225	Electric Specialty				DR	4	4		4.5	4.5	10	35	Y	36x12	22x10	N		20
154	3	135	225	Electric Specialty				DR	4	4		4.5	4.5	10	35	Y	36x12	22x10	N		21
154	3	135	225	Electric Specialty				DR	4	4		4.5	4.5	10	35	Y	36x16	22x10	N		22
156	3	138	226	Electric Specialty				DR	4	4		4.5	4.5	10	35	Y	36x16	22x10	N		23
184	3	167	255	Electric Specialty				DR	4	4		3.0	3.0	10	35	Y	36x12	36x12	N		24
185	3	168	258	Electric Specialty				DR	4	4		3.0	3.0	10	35	Y	36x12	36x12	N		25
185	3	168	258	Electric Specialty				DR	4	4		3.0	3.0	10	35	Y	36x12	36x12	N		26
87	39	63	133	Electric Specialty				DR	4	4		5.5	5.5	10	24	Y	16x4				27
99	43	66	153	Electric Specialty				DR	4	4		5.0	5.0	16	30	Y	20x5				28
105	46	71	157	Electric Specialty				DR	4	4		5.5	5.5	14	25	Y	20x6x16				29
102	45	67	154	Electric Specialty				DR	4	4		5.0	5.0	13	22	Y	20x6				30
124½	64½	76	182	Electric Specialty				DR	4	4		4.5	4.5	6	11	Y	20x6				31
125½	66	76	183	Electric Specialty				DR	4	4		4.5	4.5	6	11	Y	20x6				32
126	64	76	184	Electric Specialty				DR	4	4		4.5	4.5	6	11	Y	20x7				33
164	90	95	245	Electric Specialty				DR													34
137		105	165	Electric Specialty				DR													35
137		113	167	Electric Specialty				DR													36
41		61	96	AL MCP4002	1	12	450	DR	2	2		2.4	2.4	8	Reg	Y	10½x5	10½x5	N		37
45		61	100	AL MCP4002	1	12	450	DR	2	2		2.4	2.4	8	Reg	Y	10½x5	10½x5	N		38
54		63	109	AL MCP4002	1	12	450	DR	2	2		2.4	2.4	9	Reg	Y	10½x5	10½x5	N		39
54		63	109	AL MCP4002	1	12	450	DR	2	2		2.4	2.4	9	Reg	Y	10½x5	10½x5	N		40
60½		65	116	AL MCP4002	1	12	450	DR	2	2		2.3	2.3	9	Reg	Y	10½x5	10½x5	N		41
60½		65	116	AL MCP4002	1	12	450	DR	2	2		2.3	2.3	9	Reg	Y	10½x5	10½x5	N		42
64		68½	119	AL MCP4002	1	12	450	DR	2	2		2.2	2.2	8	Reg	Y	10½x5	10½x5	N		43
64		68½	119	AL MCP4002	1	12	450	DR	2	2		2.2	2.2	8	Reg	Y	10½x5	10½x5	N		44
72		70	128	AL MCP4002	1	12	450	DR	2	2		2.1	2.1	13	Reg	Y	10½x5	10½x5	N		45
72		70	128	AL MCP4002	1	12	450	DR	2	2		2.1	2.1	13	Reg	Y	10x5	10x5	N		46
67½		67½	87	AL MCP4002	1	12	450	DR	2	2		2.3	2.3	15	Reg	Y	10x5	10x5	N		47
67½		67½	87	AL MCP4002	1	12	450	DR	2	2		2.3	2.3	15	Reg	Y	10x5	10x5	N		48
76½		75	92½	AL MCP4002	1	12	450	DR	2	2		2.0	2.0	6	Reg	Y	10x5	10x5	N		49
76½		75	92½	AL MCP4002	1	12	450	DR	2	2		2.0	2.0	14	Reg	Y	10x5	10x5	N		50
				AL MCP4002	1	12	450	DR	2	2		2.0	2.0	5	Reg	Y	10x5	10x5	N		51
				AL MCP4002	1	12	450	DR	2	2		2.0	2.0	5	Reg	Y	10x5	10x5	N		52
				AL MCP4002	1	12	450	DR	2	2		2.0	2.0	8	Reg	Y	10x6½x5	10x6½x5	N		53
				AL MCP4002	1	12	450	DR	2	2		2.0	2.0	14	Reg	Y	10x5	10x5	N		54
				AL MCP4002	1	12	450	DR	2	2		2.0	2.0	14	Reg	Y	10x5	10x5	N		55
		63	74	Kim ET423	1¼	12	600	DR	3	3		3.4	3.4	25	Reg	Y	10x5	10x5	N		56
		63	74	Kim ET423	1¼	12	600	DR	3	3		3.4	3.4	25	Reg	Y	10x5	10x5	N		57
		63	74	Kim ET423	1¼	12	600	DR	3	3		3.4	3.4	25	Reg	Y	10x5	10x5	N		58
		63	74	Kim ET423	1¼	12	600	DR	3	3		3.4	3.4	18	Reg	Y	10x5	10x5	N		59
		63	74	Kim ET423	1¼	12	600	DR	3	3		3.4	3.4	18	Reg	Y	10x5	10x5	N		60
		63	74	Kim ET423	1¼	12	600	DR	3	3		3.4	3.4	18	Reg	Y	10x5	10x5	N		61
67		57	109	Int U2A	25			Conv	2	2	Ff	7.0	7.0	50	75		16¼x6x11¼	13x4½x8	Y		62
67		57	109	Int U2A	25			Conv	2	2	Ff	7.0	7.0	50	75		16¼x6x11¼	13x4½x8	Y		63
69¾		58½	112	Cont F124	31½			Conv	2	2	Ff	7.0	7.0	50	75		17¾x6x12½	14x4½x8	Y		64
69¾		58½	112	Cont F124	31½			Conv	2	2	Ff	7.0	7.0	50	75		17¾x6x12½	14x4½x8	Y		65
69¾		58½	112	Cont F124	31½			Conv	2	2	Ff	7.0	7.0	50	75		17¾x6x12½	14x4½x8	Y		66
69¾		58½	112	Cont F124	31½			Conv	2	2	Ff	7.0	7.0	50	75		17¾x6x12½	14x4½x8	Y		67
75		60	120	Cont F124	31½			Conv	2	2	Ff	8.5	8.5	50	75		6.00/9	5.00/8	Y		68
75		60	120	Cont F124	31½			Conv	2	2	Ff	8.5	8.5	50	75		6.00/9	5.00/8	Y		69
71		61	119	Atco	5	(52)	450	DR	4	4		5.0	5.0	47	75	Y	16¼x6x11¼	13x4½x8	N		70
71		61	119	Atco	5	(52)	450	DR	4	4		5.0	5.0	47	75	Y	16¼x6x11¼	13x4½x8	N		71
64		58	112	Atco	5	(52)	450	DR	4	4		5.0	5.0	40	75	Y	16¼x6x11¼	10½x5x5	N		72
64				Atco	5	(52)	450	DR	4	4		5.0	5.0	40	75	Y	18x7x12½	10½x5x5	N		73
64				Atco	5	(52)	450	DR	4	4		5.0	5.0	40	75	Y	18x7x12½	10½x5x5	N		74
64				Atco	5	(52)	450	DR	4	4		5.0	5.0	40	75	Y	18x7x12½	10½x5x5	N		75
64				Atco	5	(52)	450	DR	4	4		5.0	5.0	40	75	Y	18x7x12½	10½x5x5	N		76
71		62	120	Atco	5	(52)	450	DR	4	4		5.0	5.0	47	75	Y	18x7x12½	14x4½x8	N		77
71		62	120	Atco	5	(52)	450	DR	4	4		5.0	5.0	47	75	Y	18x7x12½	14x4½x8	N		78
71		62	120	Atco	5	(52)	450	DR	4	4		5.0	5.0	47	75	Y	18x7x12½	14x4½x8	N		79
71		62	120	Atco	5	(52)	450	DR	4	4		5.0	5.0	47	75	Y	18x7x12½	14x4½x8	N		80
64		58	112	Atco	5	(52)	450	DR	4	4		5.0	5.0	40	75	Y	16¼x6x11¼	10½x5x5	N		81
44				AL MCP4002	1	12	300		2	2		2.5	2.5	9	Reg	Y	10x6½x5	10x6½x5	N		82
54		54	92½	AL MCP4002	1	12	600		2	2		2.4	2.4	9	Reg	Y	10x6½x5	10x6½x5	N		83
60½		57	99	AL MCP4002	1	12	600		2	2		2.3	2.3	9	Reg	Y	10x6½x5	10x6½x5	N		84
64		59	102½	AL MCP4002	1	12	600		2	2		2.2	2.2	8	Reg	Y	10x6½x5	10x6½x5	N		85
72		63	112	AL MCP4002	1	12	600		2	2		2.1	2.1	13	Reg	Y	10x6½x5	10x6½x5	N		86
77		67	83	AL MCP4002		12	600	DR	2	2		2.0	2.0	14	Reg	Y	10x5	10x5	N		87
77		67	83	AL MCP4002		12	600	DR	2	2		2.0	2.0	14	Reg	Y	10x5	10x5	N		88
104		74	138	Electric Specialty		(4)	500	DR	4	4		6.0	6.0	20	45	Y	20x7	17x5	Y		89

For Abbreviations and References see pages 96 and 97

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED HIGH-LIFT FORK

Line Number	MAKE AND MODEL	MAXIMUM CAPACITY: Load (lb.)	MAXIMUM CAPACITY: Load Center (In.)	Service Weight (lb.)—Excluding Battery	Operator—Sits, Stands, Walks	Lift—Fork or Platform	Lifting Power	MAST: Telescopic	MAST: Tilt: Rearward (Deg.)	MAST: Tilt: Forward (Deg.)	Wheelbase (In.)	Face of Forks to Centerline of Front Axle	Load Center (In.)	OVERALL DIMENSIONS: Length: Less Forks	Length: Fork: Minimum	Length: Fork: Maximum	Height: Underclearance: At Truck Center	Height: Underclearance: At Mast	Height: Free Lift	Height: Mast Collapsed: Minimum	Height: Mast Collapsed: Maximum	Height: Mast Extended: Minimum	Height: Mast Extended: Maximum	Height: Lifting: Minimum	Height: Lifting: Maximum	Height: Overall—Including Carriage or Backguard
90	KM31A-6	6000	24	.....	St	Fk	Hyd	Y	10	3	47	15	24•	95	36†	.....	5¾	.....	55	68	83	123	153	89	119	153
91	RSEAT-2	2000	15	.....	St	Fk	Hyd	Y	.....	.....	52¾	29⅝	24†	29¾	30†	.....	2¾	2¾	.....	83	.....	178	.....	126	.....	.....
92	RSEFAT-2	2000	15	.....	St	Fk	Hyd	Y	4	.....	42¼	.....	24†	27¾	30†	.....	2¾	2¾	.....	83	.....	.....	.....	126	.....	.....

ABBREVIATIONS

•—Including battery.
†—Standard.
♣—Without load.
■—Maximum.
■—With 48" load.
‡—Includes battery and counterweight.
♣—Including platform or forks.
‡—Automatic transmission available on gasoline or LPG models.
▾—With 36" x 36" load.
△—Minimum.
♦—For minimum standard lift.

(1)—60 to 72.
(2)—36x12 or 36x16.
(3)—48 to 60.
(4)—30 to 36.
(5)—24 to 36.
(6)—350 to 400.
(7)—Hercules LXB gasoline engine and Baker 18-2460 electric motor.
(8)—Gasoline engine, 34; electric motor, 7-8.
(9)—36 to 48.
(10)—250 to 450.
(11)—350 to 500.
(12)—400 to 550.
(13)—450 to 600.
(14)—500 to 650.
(15)—600 to 700.
(16)—650 to 750.
(17)—750 to 800.
(18)—24 to 32.
(19)—32 to 36.
(20)—36 to 60.
(21)—48 to 72.
(22)—250 to 300.
(23)—300 to 360.
(24)—350 to 420.
(25)—375 to 480.
(26)—450 to 540.
(27)—300 to 485.
(28)—130 to 250.
(29)—340 to 500.
(30)—Two standard; three optional.
(31)—28 to 30.
(32)—350 to 450.
(33)—450 to 550.
(34)—300 to 350.
(35)—Hercules, Continental or Chrysler.
(36)—50 and 10.
(37)—70 and 14.
(38)—64 and 20.
(39)—64½ and 20.
40)—96 and 20.

POWERED NON-LIFT

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Rated Capacity (lbs.)	Service Weight (lbs.)	OPERATOR: Rides or Walks	OPERATOR: Sits or Stands	Motive Power	Frame Type	Controls & Steering	OVERALL TRUCK DIMENSIONS (Ins.): Width	Length	Height	Wheelbase	PLATFORM DIMENSIONS (Ins.): Length	Width	Height from Ground	No. of Drive Wheels	No. of Steering Wheels	TIRES: ON DRIVE WHEELS: Type	ON DRIVE WHEELS: Size	STEERING WHEELS: Type	STEERING WHEELS: Size
1	Atlas HP-3	6000	3800	R	St	EM	.....	.....	46	111	50	55	90	46	25½	2	4	So	20x5	So	20x5
2	3-LWH	6000	3900	R	St	E-G	.....	.....	42	116½	50	60	60	42	11	2	4	So	20x6	So	10x6
3	Automatic FP-20	2000	1935	R	S	EM	Str	1	40	109	.....	60	60½	40	14¾	2	1	Cu	14x4½	Cu	14x4½
4	HN-2	4000	3730	R	St	EM	Str	1	39	114½	.....	65	64	38	12¾	2	4	So	22x4½	So	10x6
5	HN-3	6000	4700	R	St	EM	Str	1	41	118½	.....	65	64	41	12¾	2	4	So	20x6	So	10x6
6	EN-2	4000	4000	R	St	EM	Str	1	46	105¾	.....	55	84	46	24	2	4	So	22x4½	So	22x4½
7	EN-3	6000	4255	R	St	EM	Str	1	45	107	.....	53	84	45	22¾	2	4	So	20x5	So	20x5
8	Crescent PDB-4	4000	4800	R	St	EM	Dr	1	42	118½	52⅝	67	60	42	12	2	4	SC	20x4x16	So	10½x5x6½
9	RDB-6	6000	5600	R	St	EM	Dr	1	42	118½	52⅝	67	60	42	12	2	4	SoC	20x4x16	So	10½x5x6½
10	RSE-10	10000	3900	R	St	EM	Str	1	42	112½	53⅝	66½	90	42	26	2	4	SoC	22x6x16	SoC	22x6x16
11	Elwell-Parker FH-6	6000	2900	R	St	E-G	Str	1	42¾	124¾	58	60	64	41	12¼	2	4	So	22x6	So	10x6
12	WH-6	6000	2975	R	St	E-G	Str	1	42⅞	146½	58	78	86	41	17¼	2	4	So	22x6	So	15x6
13	IE	6000	2475	R	St	E-G	Str	1	40	111¼	58¼	60	84	40	25	2	4	So	20x3½	So	20x5
14	SE	4000	2650	R	St	E-G	Str	2	45	150	84	83½	138¾	44	34	2	4	So	27x3½	So	27x3½
15	HH CC-47	4000	2850	R	S	GE	Str	1	(13)	150	.....	96	108	60	25	2	2	So	20x5	So	20x5
16	CC-50	4000	3300	R	S	GE	Str	1	60	168	.....	96	108	60	25	2	2	P	6.00/9	P	6.00/9
17	SP-CC-52-4WB	4000	2830	R	S	GE	Str	1	48	164	.....	90	120	48	25	2	2	P	6.00/9	P	6.00/9
18	53	2000	1700	R	S	GE	Str	1	48	111	.....	60	72	48	54	2	2	P	6.00/9	P	6.00/9
19	Hyster Cargo Truck	4000	1510	R	St	GE	Str	1	42	103½	58	73½	60	42	7⅛	1	2	Cu	16¼x4	So	6x6
20	Kalamazoo 2500	3500	1150	R	.....	GE	Str	1	42	96	48	59¼	54	42	18½	2	1	P	5.80/16	P	5.80/16
21	Kwik-Mix S10	1500	880	R	St	GE	Str	1	34	80	49½	34¾	48	34	20	2	2	P	5.00/16	P	12x4
22	R15	2000	1100	R	S	GE	Str	1	36	94	48	43½	54	34	22	2	2	P	5.00/16	P	5.00/16
23	Market Forge Freight Truck	6000	950*	R	Sst	E-G	Str	1	36	92¼	45	55½	57	36	13⅝	1	1	Cu	10½x7	Cu	10x5
24	Mercury A-823	2000	1250*	R	S	EM	Str	1	40	111¼	51½	63	(5)	40	22	2	1	PC	(6)	PC	(7)
25	A-1014	4000	2700*	R	St	EM	Str	1	46	112	56	61	89	46	27½	2	2	So	20x4	So	20x4
26	A-1014	6000	2800*	R	St	EM	Str	1	46	112	56	61	89	46	27½	2	2	So	20x5	So	20x5
27	A-1015	4000	2600*	R	St	EM	Dr	1	41	120⅛	56	71	72	41	11⅜	2	2	So	20x4	So	10½x5
28	A-1015	6000	2700*	R	St	EM	Dr	1	41	120⅛	56	71	72	41	11⅜	2	2	So	20x5	So	10½x6
29	Whiteman UPB	2000	1050	R	S	GE	Str	1	44	108	48	54	63	44	19	2	2	P	4.00/8	P	4.00/8
30	Yale & Towne K20-6	6000	2535	R	St	E-G	Str	1	42	108⅜	51	61	86¾	42	25½	2	4	Cu	20x5	Cu	20x5
31	FM20	2000	1225	R	S	E-G	Str	1	40	96	.....	62	96	42	22	2	1	PC	18x5¾	PC	18x5¾
32	K32	4000	3300	R	St	E-G	Str	2	45	176	84	126½	148	45	(12)	2	4	So	27x3½	So	27x3½
33	K36	4000	3300	R	St	E-G	Dr	2	45	176	84	126½	148	45	34	2	4	So	27x3½	So	27x3½

OR PLATFORM TRUCKS—*concluded*

TURNING RADIUS (In.) With 40"x48" Pallet				ENGINE OR MOTOR		BATTERY		TRANSMISSION				SPEEDS With Capacity Load					TIRE SIZES		TOWING		
												Truck									
Outside (Tailswing)	Inside	Intersecting Aisle Width	Minimum Aisle for Right Angle Stacking	Make and Model	Horsepower	Normal Voltage	Ampere Hours	Conventional or Automatic	No. of Forward Speeds	No. of Reverse Speeds	Clutch Type	Forward (mph)	Reverse (mph)	Hoisting (fpm)	Lowering (fpm)	Dead Man Brake	Drive Wheels	Steering Wheels	Provision for—	Max. Drawbar Pull	Line Number
				Electric Specialty		(4)	500	DR	4	4		6.0	6.0	20	45	Y	20x7	17x5	Y		90
		64	87	Kim ET423	1¼	12	800	DR	3	3		3.4	3.4	25			10x5	10x5	N		91
		57	65	Kim ET423	1¼	12	600	DR	3	3		3.4	3.4	25			10x5	10x5	N		92

(41)—53½ to 59.
(42)—50 to 55.
(43)—61½ to 79½.
(44)—62½ to 80½.
(45)—36 to 45.
(46)—Two standard; four optional.
(47)—Platform plus 14½".
(48)—Load length plus 24".
(49)—Gasoline or diesel.
(50)—Gasoline or LPG.
(51)—Gasoline, diesel or LPG.
(52)—30 to 32.
AB—Automotive regenerative brake.
AL—Electric Auto-Lite Co
Aut—Automatic.
CA—Conventional and automatic.
Ch—Chain.
Chry—Chrysler Corp.
Cont—Continental Motors Corp.
Conv—Conventional.
DB—Dynamic brake.
DR—Double reduction gear drive.
Ele—Electric.
FE—Friction and electric.
Ff—Friction and fluid.
FF—Friction or fluid.
Fk—Fork
Fkr—Fork or ram.
Fl—Fluid.
Fr—Friction.
FR—Fork ram.
FV—Flow control valve.
GE—General Electric Co.
HC—Hydraulic and chain.
HE—Hydraulic electric.
Her—Hercules Motor Co.
Hyd—Hydraulic.
Inf—Infinite.
Int—International Harvester Co.
JIC—J I Case & Co.
Kim—Star Kimble Co.
N—No or none.
OGE—Own, General Electric or Electric Specialty Co.
Opt—Optional.
Ptf—Platform.
Reg—Regulated.
S—Sits.
SA—Designed for specific application.
Sp—Built to specification.
Ss—Sits or stands.
St—Stands.
Var—Various.
W—Walks.
Wau—Waukesha Motor Co.
Wil—Willys Motor Co.
Wis—Wisconsin Motor Co.
Y—Yes.

PLATFORM TRUCKS

A multitude of variations are available from any of the companies listed.

TURNING RADIUS				MOTOR OR ENGINE		BATTERY		SPEEDS						GRADABILITY Per Cent		
										TRUCK						
										Unloaded		Loaded				
Inside (In.)	Outside (In.)	Intersecting Aisle Width (In.)	Dead Man Brake	Make and Model	Horsepower	Normal Voltage	Ampere Hours	No. of Forward	No. of Reverse	Forward (mph)	Reverse (mph)	Forward (mph)	Reverse (mph)	Unloaded	Capacity Load	Line Number
36	93	68	Y	Own 1175	5	30	306	3	3	6.0	6.0	4.5	4.5	33	21	1
37	92	66	Y	Own 1175	5	30	306	3	3	6.0	6.0	4.5	4.5	33	21	2
24	90	66	Y	Auto-Lite	1½	24		3	3	5.5	5.5	5.0	5.0			3
50	102	64	Y	Own		30		4	4	8.0	6.0	5.1	5.1			4
46	103	69	Y	Own		30		4	4	6.5	6.5	4.7	4.7			5
41	98	69	Y	Own		30		4	4	6.0	6.0	5.1	5.1			6
41	100	68	Y	Own		30		4	4	6.5	6.5	4.7	4.7			7
100		68	Y	Kim 345B		(1)	450	4	4	6.0	6.0	5.0	5.0	15	10	8
100		68	Y	Kim 345B		(1)	450	4	4	6.0	6.0	5.0	5.0	15	10	9
101		67	Y	Kim 345B		(2)	500	4	4	6.0	6.0	5.0	5.0	15	10	10
45	105	70	Y	Own				4	4	5.5	5.5	4.0	4.0			11
61	123	78	Y	Own				4	4	6.0	6.0	4.5	4.5			12
45	101	69	Y	Own				4	4	6.0	6.0	4.0	4.0			13
71	138	89	Y	Own				4	4	6.0	6.0	3.0	3.0			14
			N	Chrysler	98			3	1	25.0						15
			N	Chrysler	98			3	1	35.0						16
			N	Chrysler	98			3	1	35.0						17
			N	Ford				3	1	30.0						18
0	89	72	N	Wis AKN	6			V	V	12.0	12.0	8.0	8.0	32	9	19
5½	79½		Opt	Wis TF	14½			3	1	15.0	3.0	15.0	3.0			20
6	61	53	Y	Wis AKN	6			1	1	4.5	4.5	4.5	4.5	20	20	21
6	73	60	N	Wis AEN	8			1	1	6.0	6.0	6.0	6.0	20	20	22
3	74	48	Y	Bal 183-D	1		(3)	(4)	(4)	5.0	5.0	4.0	4.0	20	10	23
	82		Y	Own		(8)	(9)	3	3	8.0	8.0	6.5	6.5			24
	97	69	Y	Own		(8)	(10)	3	3	6.0	6.0	4.5	4.5			25
	97	69	Y	Own		(8)	450	3	3	6.0	6.0	4.5	4.5			26
	108	69	Y	Own		(8)	(10)	3	3	6.0	6.0	4.5	4.5			27
	108	69	Y	Own		(8)	450	3	3	6.0	6.0	4.5	4.5			28
	108	72	N	Glad 75	7½			V	V	16.0	16.0	13.0	13.0	16	10	29
47	104	67	Y	Electric Specialty				4	4	6.0	6.0	5.0	5.0	15½	15½	30
	83	66	Y	Electric Specialty				4	4	9.0	9.0	8.0	8.0	7¾	7¾	31
102	168	94	Y	Electric Specialty				4	4	7.0	7.0	6.0	6.0	8	7	32
102	168	94	Y	Electric Specialty				4	4	7.0	7.0	6.0	6.0	8	7	33

ABBREVIATIONS

*—Without battery.
(1)—16 to 19.
(2)—18 to 21.
(3)—340 to 500.
(4)—Two standard; three optional.
(5)—61½ to 88.
(6)—4.00/12 or 21x5.
(7)—5.00/8 or 17x4½.
(8)—28 to 30.
(9)—225 to 250.
(10)—300 to 450.
(12)—11 and 34.
(13)—48 and 60.
Bal—Baldor Co.
Cu—Cushion.
Dr—Drop.
E-G—Electric or gas-electric.
EM—Electric motor.
GE—Gasoline engine.
Glad—Gladden Motor Co.
Kim—Star Kimble Co.
N—No or none.
Opt—Optional.
P—Pneumatic.
PC—Pneumatic or cushion.
R—Rides.
S—Sits.
SC—Solid and cushion.
So—Solid.
SoC—Solid or cushion.
Sst—Sits or stands.
St—Stands.
Str—Straight.
V—Various.
Wis—Wisconsin Motor Co
Y—Yes.

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED LOW-LIFT FORK

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Maximum Load Capacity (lbs.)	Service Weight (lbs.)—Excluding Battery	Operator—Walks or Rides	Motive Power	Lifting Power	OVERALL CHASSIS DIMENSIONS (Ins.)				PLATFORM DIMENSIONS (Ins.)						FORK DIMENSIONS (Ins.)						
											Length		Width		Height Above Ground		Length			Lateral Outside Overall Width		Height Above Ground	
							Length—Excluding Platform or Forks	Width	Height—To Top of Controls	Lowest Underclearance	Minimum	Maximum	Minimum	Maximum	Lowered	Elevated	Minimum	Maximum	Width of Face	Minimum	Maximum	Lowered	Elevated
1	Atlas 3EA17	6000	4400*	R	E-G		122†	40½		3⅞	54▲		27▲		11	17							
2	Automatic LN-2	4000	2475	R	EM	Hyd	112½†	39†			55▲		26▲		10¼	16¼							
3	LN-3	6000	3150	R	EM	Hyd	120½†	41†			55▲		27▲		10¾	16¾							
4	LO-5	10000	4500	R	EM	Mec	126½†	41†			60▲		26▲		11	16							
5	PE-427	4000		W	EM	Hyd	30⅞	30	50	1⅝							29½	59½	9▲	27▲		3⅝	8½
6	PE-827	6000		W	EM	Hyd	30⅞	30	50	1⅝							29½	59½	9▲	27▲		3⅝	7½
7	TNE-4	4000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	20▲		(2)	(3)							
8	TWE-4	4000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	26½▲		(2)	(3)							
9	TNE-6	6000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	20▲		(2)	(3)							
10	TWE-6	6000		W	EM	Hyd	31⅝	30	50	2⅜	36	72	26½		(2)	(3)							
11	TWH-4	4000		W	EM	Hyd	33¾	30	50	2⅛	30	60	27		6½	21							
12	TWH-6	6000		W	EM	Hyd	33¾	30	50	2⅛	30	60	27		6½	21							
13	ETWE-4	4000		R	EM	Hyd	29⅝	32		2½	36	72	26½		(2)	(3)							
14	EPE-4	4000		R	EM	Hyd	29½	32		1¼							30	60	9▲	27▲		3⅝	7½
15	Baker E-3	6000	3500	R	E-G	Hyd	70⅜	42¾	56½	4	55	84	26½	48	10⅝	16¼							
16	E-5	10000	4500	R	E-G	Hyd	71⅝	42¾	56½	4	60	96	26½	48	10⅝	16¼							
17	Barrett PO-40	4000	1625	W	EM	HE	38 11/16	36	59 13/16	1⅝	36	60	24¾		6½								
18	PO	4000	1132	W	EM	HE	32⅝	27¼	59 13/16	3⅝	36	72	20		(2)	(6)							
19	POK	4000	1176	W	EM	HE	32⅝	27¼	59 13/16	3⅝	36	72		25	(2)	(6)							
20	PX	4000	1145	W	EM	HE	33	27¼	59 13/16	7/8							30	60	9	27		3¼	7½
21	STF-40	4000	1835	W	EM	HE	38 11/16	52⅛	59 13/16	1½							24	48	4	8	32	2	8
22	Buda CB-20	2000	1300	R	GE		97†	40†	50	3													
23	Clark 40LP	4000	940	W	E-G	Hyd	26¼	32	52	2 7/16	36	72	18	26	(34)	(35)							
24	60LP	6000	970	W	E-G	Hyd	26¼	32	52	2 7/16	36	72	18	26	(34)	(35)							
25	40P	4000	1040	W	E-G	Hyd	26¼	32	52	2¾							30	60	9¼		27	3¼	7¼
26	60P	6000	1070	W	E-G	Hyd	26¾	32	52	2¾							30	60	9¼		27	3¼	7¼
27	Colson S-4	4000	1075	R	GE	Hyd	30	29			30	72		24	(36)	(37)							
28	Crescent PLA-4	4000		R	E-G	Hyd	110	38		4	48		24		7	20							
29	PLB-4	4000		R	E-G	Hyd	115	38		4	48		24		7	20							
30	KLB-10	10000		R	E-G	Hyd	130	42		4½	60		27		11	24							
31	Elwell-Parker EQ-4	4000	2100	R	EM	Mec	95¾†	31¼†	54¾	3	41	66	24	26½	10½	15							
32	EQ-4	4000	2100	R	EM	Mec	87¼†	31¼†	54¾	2⅝	41	60	18½	26½	7	10¼							
33	EP-4-11	4000	3150	R	EM	Mec	119⅞†	43†	56⅜	4	54	120	26½	36	10¾	16½							
34	EP-6	6000	3200	R	EM	Mec	119⅝†	42¾†	58	4	54	120	26½	36	10¾	16½							
35	GEP-6	6000	3900	R	GE	Hyd	125†	42¾†	58	4	54	120	26½	36	10¾	16½							
36	EW-6	6000	3450	R	EM	Mec	120½†	42¾†	58	10¼	54	108	26½	36	16½	22½							
37	EP-10	10000	3600	R	EM	Mec	129†	43†	59½	3¾	60	120	26½	40	11	16¾							
38	GEP-10	10000	4200	R	GE	Hyd	132†	42¾†	58	3⅞	60	120	26½	40	11	16¾							
39	EY-ZO	20000		R	EM	Hyd	146⅝†	45†	58	5	75		41		17½	23½							
40	L-13	20000		R	EM	Hyd	155¼†	48†	58	2½	72		26½		11½	17¼							
41	L-12	20000		R	EM	Hyd	166½	50	58	2	96		36		11½	17							
42	L-3	30000		R	EM	Hyd	138½	56½	60	8	60		50		18	24							
43	L-14	40000		R	EM	Hyd	187	56½	60	6	96		41		17½	23½							
44	Erickson P5	5000	2700	R	GE	Hyd	60	40	65	7	60	Var	Var	Var	11	21							
45	P7	7000	3000	R	GE	Hyd	60	40	65	7	60	Var	Var	Var	11	21							
46	Kalamazoo 301	800	1000	R	GE	Hyd	63¼	33½	45	4							18	25	3▲	6	32	¾	18¾
47	Lewis-Shepard M4P	4000	1890	R	EM	Hyd	29⅞	42	60	1							36	60	9¼▲	25	36	3¼	7¼
48	M4N	4000	1790	R	EM	Hyd	21⅜	42	60	2	36	72	18		(2)	(20)							
49	M4W	4000	1790	R	EM	Hyd	21⅜	42	60	3	30	72		36	(2)	(20)							
50	E4P	4000	1050	W	EM	Hyd	33	32	54	1							32	60	9¼▲	25	36	3¼	7¼
51	E6P	6000	1250	W	EM	Hyd	33	32	54	1							32	60	9¼▲	25	36	3¼	7¼
52	E4TP	4000	1000	W	EM	Hyd	33	32	54	1							24	42	6▲	16		3¼	7¼
53	E4N	4000	(15)	W	EM	Hyd	25⅝	32	54	2	36	72	18		(2)	(20)							
54	E4W	4000	(15)	W	EM	Hyd	25⅝	32	54	3	30	72		36	(2)	(20)							
55	E6N	6000	(15)	W	EM	Hyd	25⅝	32	54	2	36	72	18		(2)	(20)							
56	E6W	6000	(15)	W	EM	Hyd	25⅝	32	54	3	30	72		36	(2)	(20)							
57	Lift Trucks KNS	6000	1300	W	EM	Hyd	31¾	32⅜	50¾		36	72	18	20	(2)	(3)							
58	KMS	6000	1400	W	EM	Hyd	31¾	32⅜	50¾		36	72	21	25	(2)	(3)							
59	KWS	6000	1600	W	EM	Hyd	31¾	32⅜	50¾		36	72	26¾		(2)	(3)							
60	KPNS	4000	1200	W	EM	Hyd	33⅜	32⅜	50¾	¾							30	60	8½▲	22	26	3¼	7¼
61	KPWS	4000	1300	W	EM	Hyd	33⅜	32⅜	50¾	¾							30	60	10▲	27		3¼	7¼
62	Market Forge Skid Lift Truck	6000	(16)	W	E-G	Hyd	43	(18)	45	(19)	30	72	18	26	(2)	(20)							
63	Pallet Lift Truck	6000	(17)	W	E-G	Hyd	43	28	45	1¼							30	72	11▲	27	27	(21)	7¼
64	Mercury A-1007	3000	2100	R	EM	Hyd	56	33¾		2 7/16			18		7	18							
65	A-1007	4000	2300	R	EM	Hyd	56	33¾		2 7/16			18		7	18							
66	A-1017	4000	3200	R	EM	Hyd	60	41½		4 3/16			24		11	23							
67	A-1020	6000	3400	R	EM	Hyd	60	41½		4 3/16			24		11	23							
68	A-1011	10000	4500	R	EM	Hyd	69½	42		3 5/16			26⅝		11 1/16	22							
69	Raymond EL4P	4000	1360	R	EM	Hyd	30 13/16	34	55	2	30	48	18	24	(2)	(20)							
70	EL4F	4000	1410	R	EM	Hyd	30	34	55	1½							30	48	9¼▲	24	30	3¼	7¼

OR PLATFORM TRUCKS

A multitude of variations are available from any of the companies listed.

Make and Model	Horsepower	Battery: Normal Voltage	Battery: Ampere Hours	Speeds With Capacity Load: Truck (mph)	Speeds With Capacity Load: Time of Lift (sec)	Gradability (Per Cent): Unloaded	Gradability (Per Cent): Capacity Load	Dead Man Brake	Wheels: Drive: Number	Wheels: Drive: Diameter (In.)	Wheels: Fork: Set Tandem	Wheels: Fork: Number in Each Fork or Trail	Wheels: Fork: Diameter (In.)	Line Number
Own 1175	5	30	306	4¾	1.0	30	20	Y	2	20	.....	2	10	1
Own		30	.....	5.4	3.4	.....	.....	Y	2	22x4½	N	2	9x5	2
Own		(1)	.....	4.0	4.2	.....	.....	Y	2	20x6	N	2	10x6	3
Own		36	.....	5.5	3.8	.....	.....	Y	2	20x6	N	2	10x6	4
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x5	D	2	3⅜	5
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	D	2	3⅜	6
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x5	N	2	(4)	7
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x5	N	2	(4)	8
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	N	2	(4)	9
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	N	2	(4)	10
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x5	N	2	5½x4½	11
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	1	10x6	N	2	5½x4½	12
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	2	10x4	N	2	(4)	13
Auto-Lite	1½	12	.....	.....	.....	.....	.....	Y	2	10x4	D	2	3⅜	14
Own 2460	8	36	450	4.8	4.0	10	8	Y	2	22x6	N	2	10x6	15
Own 2460	8	36	500	4.0	6.0	10	8	Y	2	22x6	Y	4	10x6	16
Own	1	12	(5)	2.0	60.0	10	6	Y	1	10	N	1	6	17
Own	1	12	(5)	2.5	6.0	28	10	Y	1	10	N	2	(2)	18
Own	1	12	(5)	2.5	6.0	28	10	Y	1	10	N	2	(2)	19
Own	1	12	(5)	2.5	4.0	25	9	Y	1	10	N	1	3	20
Own	1	12	(5)	2.0	60.0	10	6	Y	1	10	N	1	6	21
Wis TF	13⅓	.....	.....	10.0	.....	.....	12	Y	2	16¾	.....	1	16¾	22
		12	.....	2.3	.....	.....	.....	Y	1	10½x6x5	.....	2	6x5	23
		12	.....	2.3	.....	.....	.....	Y	1	10½x6x5	.....	2	6x5	24
		12	.....	2.3	.....	.....	.....	Y	1	10½x6x5	Y	2	6x3¼	25
		12	.....	2.3	.....	.....	.....	Y	1	10½x6x5	Y	2	6x3¼	26
	6	.....	.....	4.0	.....	.....	.....	Y	1	10½x5	.....	2	7x5	27
Kim 345B		32	450	5.5	20	15	10	Y	2	16	Y	2	6½	28
Kim 345B		32	500	5.5	20	15	10	Y	2	16	Y	2	6½	29
Kim 345B		32	500	4.0	15	15	10	Y	.....	.....	Y	2	6½	30
Own		(7)	.....	4.0	2½	.....	.....	Y	2	15x5	N	2	9x5	31
Own		(7)	.....	4.0	2½	.....	.....	Y	2	15x5	Y	4	6½x4½	32
Own		(8)	.....	4.8	4	.....	.....	Y	2	22x4½	N	2	10x6	33
Own		(8)	.....	4.8	4	.....	.....	Y	2	22x6	N	2	10x6	34
Her F-162	34	.....	.....	.....	.....	.....	.....	Y	2	22x6	N	2	10x6	35
Own		(8)	.....	4.0	4	.....	.....	Y	2	22x6	N	2	15x5	36
Own		36	.....	4.5	5	.....	.....	Y	2	22x6	Y	4	10x6	37
		.....	.....	6.5	6	.....	.....	Y	2	22x6	Y	4	10x6	38
Own		(9)	.....	3.0	7	.....	.....	Y	2	22x6	Y	4	15x8½	39
Own		60	.....	3.0	7	.....	.....	Y	2	22x7	T	6	10x6	40
Own		60	.....	2.5	8	.....	.....	Y	2	22x7	Q	8	10x6	41
Own		60	.....	2.5	7	.....	.....	Y	2	22¾x10	Y	4	15x4	42
Own		60	.....	3.0	7	.....	.....	Y	2	22x10	T	6	15x10	43
Int U2A	24	6	20	25.0	.....	24	30	N	2	6.00/16	.....	.....	10½x7x6½	44
Int U2A	24	6	20	25.0	.....	24	30	N	2	6.00/16	.....	.....	10½x7x6½	45
Wis AEN	7½	.....	.....	6.0	.....	.....	20	N	2	16	N	.....	16	46
General Electric		12	(12)	3.8	6	20	6¾	Y	1	10½	N	1	3¼	47
General Electric		12	(12)	3.4	6	20	6¾	Y	1	10½	.....	2	(10)	48
General Electric		12	(12)	3.4	6	20	6¾	Y	1	10½	.....	2	(10)	49
Auto-Lite		12	(14)	3.0	6	44	10¾	Y	1	10½	N	1	3¼	50
Auto-Lite		12	(14)	2.8	9	44	7⅓	Y	1	10½	N	1	3¼	51
Auto-Lite		12	(14)	3.0	6	44	10¾	Y	1	10½	N	1	3¼	52
Auto-Lite		12	(14)	3.0	6	44	10¾	Y	1	10½	.....	2	(10)	53
Auto-Lite		12	(14)	3.0	6	44	10¾	Y	1	10½	.....	2	(10)	54
Auto-Lite		12	(14)	2.8	9	44	7⅓	Y	1	10½	.....	2	(10)	55
Auto-Lite		12	(14)	2.8	9	44	7⅓	Y	1	10½	.....	2	(10)	56
Bal 183-D	1	12	300	2.0	.....	.....	.....	N	2	10	N	.....	.....	57
Bal 183-D	1	12	300	2.0	.....	.....	.....	N	2	10	N	.....	.....	58
Bal 183-D	1	12	300	2.0	.....	.....	.....	N	2	10	N	.....	.....	59
Bal 182-D	¾	12	300	2.0	.....	.....	.....	N	2	10	N	(13)	3¼	60
Bal 182-D	¾	12	300	2.0	.....	.....	.....	N	2	10	N	(13)	3¼	61
Bal 183-D	1	12	(22)	4.0	10	20	10	Y	1	10½x7	.....	.....	.....	62
Bal 183-D	1	12	(22)	4.0	10	20	10	Y	1	10½x7	Y	6	3¼x2	63
Own		(23)	(24)	4.3	2	.....	.....	Y	2	16	N	2	6½	64
Own		(23)	350	4.3	2	.....	.....	Y	2	16	Y	4	6½	65
Own		(23)	450	4.5	3	.....	.....	Y	2	20	N	2	10½	66
Own		(23)	(25)	4.5	3	.....	.....	Y	2	20	N	2	10½	67
Own		(23)	(25)	4.0	3	.....	.....	Y	2	20	Y	4	10½	68
Gen 5BT-1322A57	1½	12	600	3.5	3	8	12	Y	1	10	.....	.....	.....	69
Gen 5BT-1322A57	1½	12	600	3.3	3	7	10	Y	1	10	D	2	3¼	70

ABBREVIATIONS

*—Including battery.
†—Including platform.
▲—Standard.
♦—Minimum.
(1)—30 to 36.
(2)—6, 7, 9 or 11.
(3)—9½, 10½, 12½ or 14½.
(4)—5½, 6½, 8 or 10 x 5.
(5)—250 to 450.
(6)—12, 13, 15 or 17.
(7)—24 to 30.
(8)—32 to 36.
(9)—48 to 60.
(10)—6 or 11.
(12)—450 to 540.
(13)—1 or 2.
(14)—300 to 360.
(15)—1000 to 1200.
(16)—900 to 1650 depending on length.
(17)—1100 to 1700 depending on length.
(18)—18 to 26.
(19)—3, 4, 5 or 6.
(20)—10, 11, 13 or 15.
(21)—3¼ adjustable to 4½.
(22)—340 to 500.
(23)—28 to 30.
(24)—300 to 350.
(25)—450 to 550.
(28)—27 with lead acid battery; 29 with alkaline battery.
(29)—250 to 440.
(30)—Two standard; one for forks under 36".
(31)—2¼ to 3¼.
(32)—6⅜, 7, 9 or 11.
(33)—2¼ to 2¾.
(34)—6, 7, 9, 10 or 10¾.
(35)—10, 11, 13, 14 or 14¾.
(36)—7, 9 or 11.
(37)—10, 12 or 14.
AL—Electric Auto-Lite Co.
App—Appropriate.
Bal—Baldor Co.
D—Dual.
E-G—Electric or gas-electric.
EM—Electric motor.
GE—Gasoline engine.
Gen—General Electric Co.
GS—Geared to suit requirements.
HE—Hydraulic electric.
Her—Hercules Motor Co.
Hyd—Hydraulic.
Int—International Harvester Co.
Kim—Star Kimble Co.
Lin—Linkage.
Mec—Mechanical.
N—No or none.
Q—Quad.
R—Rides.
T—Triple.
Var—Variable.
W—Walks.
Wis—Wisconsin Motor Co.
Y—Yes.

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

POWERED LOW-LIFT FORK

Line Number	MAKE AND MODEL	Maximum Load Capacity (lbs.)	Service Weight (lbs.)—Excluding Battery	Operator—Walks or Rides	Motive Power	Lifting Power	OVERALL CHASSIS DIMENSIONS (Ins.)				PLATFORM DIMENSIONS (Ins.)						FORK DIMENSIONS (Ins.)						
											Length		Width		Height Above Ground		Length			Lateral Outside Overall Width		Height Above Ground	
							Length—Excluding Platform or Forks	Width	Height—To Top of Controls	Lowest Underclearance	Minimum	Maximum	Minimum	Maximum	Lowered	Elevated	Minimum	Maximum	Width of Face	Minimum	Maximum	Lowered	Elevated
1	Revolvator 52-11	4000	1130	W	EM	Hyd	28½	32	50	3½	36	72[A]	18[A]	26½[A]	(2)	(20)							
2	52-11	6000	1200	W	EM	Hyd	28½	32	50	3½	36	72[A]	18[A]	26½[A]	(2)	(20)							
3	52-21	4000	1060	W	EM	Hyd	34	32	50								32	60[A]	9	25[A]	30	3¼	7¼
4	52-21	6000	1090	W	EM	Hyd	34	32	50								32	60[A]	9	25[A]	30	3¼	7¼
5	Towmotor W	4000	920	W	EM	Hyd	30	(28)	46	1							30	72	9[A]	27[A]		3¼	7¼
6	Yale & Towne KM4L	4000	2160	R	E-G	Lin	54¼	32¼	52	2¼	Var	Var	Var	Var	6¾	10¾							
7	K23E4	4000	3300	R	E-G	Lin	64	44½	56	4⅜	Var	Var	Var	Var	11	17							
8	K23E6	6000	3650	R	E-G	Lin	64	44½	56	4⅜	Var	Var	Var	Var	11	17							
9	K26S10	10000	4525	R	E-G	Lin	69	47	58	4½	Var	Var	Var	Var	11¼	17							
10	K26S16	16000	5800	R	E-G	Lin	62½	45	60	4½	Var	Var	Var	Var	11¼	17							
11	K26G20L	20000	10475	R	E-G	Lin	81¾	60	68	3¾	Var	Var	Var	Var	11¼	17							
12	K35-6	6000	3650	R	E-G	Lin	64¾	44½	56	8	Var	Var	Var	Var	17	23							
13	K26G20H	20000		R	E-G	Lin		60	66	5½	Var	Var	Var	Var	17	23							
14	M4	4000	1140	W	E-G	Hyd	34¼	31	50	(31)	30	96	18	36	(2)	(20)							
15	M6	6000	1200	W	E-G	Hyd	34¼	31	50	(31)	30	96	18¼	36¼	(32)	(20)							
16	M4UW	4000	1735	W	E-G	Hyd	40½	31	50	3¼	36	60	26	26	6	19							
17	M6UW	6000	1815	W	E-G	Hyd	40½	31	50	3¼	36	60	26¼	26¼	6	19							
18	M4P	4000	1085	W	E-G	Hyd	37½	31	50	2¾							30	84	9¼[A]	25	48	3⅜	7⅛
19	M6P	6000	1120	W	E-G	Hyd	37½	31	50								30	84	9¼[A]	25	48	3⅜	7⅛
20	MS4	4000	1020	W	EM	Hyd	28	31	50	(33)	30	96	18	36	(2)	(20)							
21	MS6	6000	1050	W	EM	Hyd	28	31	50	(33)	30	96	18¼	36¼	(32)	(20)							
22	MS4P	4000	1120	W	EM	Hyd	31½	31	50								30	84	9¼[A]	25	48	3¼	7¼
23	MS6P	6000	1150	W	EM	Hyd	31½	31	50								30	84	9¼[A]	25	48	3¼	7¼
24	M4TP	4000	1000	W	E-G	Hyd	38	31	50	2¼							24	36	5⅝[A]	16	27	3¼	6¼
25	M7½	7500		W	E-G	Hyd	34¼	31	50	3¼	30	96	18¼	36¼	(38)	(39)							
26	RL-4	4000		R	EM	Hyd	25¼	35	53¼	2⅞	36	60	19	26	6	15							
27	RP-4	4000		R	EM	Hyd	25¼	35	53¼	2⅞							36	60	9¼[A]	25	36	3⅛	7⅛

Manufacturers' Directory

Listed below are the names and addresses of the manufacturers who cooperated in supplying the specifications appearing in this section. Additional information on price, special models, application, engineering details, etc., can be had by writing direct to the manufacturer. Please mention DA when writing for details

The Atlas Car & Manufacturing Co.
1130 Ivanhoe Rd., Cleveland 10, Ohio

Automatic Transportation Co.
101 W. 87th St., Chicago 20, Ill.

Baker-Raulang Co.
1250 W. 80th St., Cleveland 2, Ohio

Barrett-Cravens Co.
630 Dundee Rd., Northbrook, Ill.

Buda Co., Div. Allis-Chalmers Mfg. Co.
154th & Commercial Aves., Harvey, Ill.

Champ Corp.
2318 N. Rosemead Blvd., El Monte, Calif.

Clark Equipment Co., Industrial Truck Div.
Springfield Place, Battle Creek 85, Mich.

The Colson Corp.
Elyria, Ohio

Crescent Truck Co., Div. Barrett-Cravens Co.
630 Dundee Rd., Northbrook, Ill.

The Elwell Parker Electric Co.
4205 St. Clair Ave., Cleveland 3, Ohio

Erickson Power Lift Trucks, Inc.
211 St. Anthony Blvd., N.E., Minneapolis, Minn.

Gerlinger Carrier Co.
Lyle & Birch Sts., Dallas, Ore.

H. H. Manufacturers
1140 W. Broadway, Long Beach 2, Calif.

The Frank G. Hough Co. (Payloader)
Libertyville, Ill.

OR PLATFORM TRUCKS—*concluded*

Make and Model	ENGINE OR MOTOR: Horsepower	BATTERY: Normal Voltage	BATTERY: Ampere Hours	SPEEDS With Capacity Load: Truck (mph)	SPEEDS With Capacity Load: Time of Lift (sec)	GRADABILITY (Per Cent): Unloaded	GRADABILITY (Per Cent): Capacity Load	Dead Man Brake	WHEELS: Drive: Number	WHEELS: Drive: Diameter (In.)	WHEELS: Fork: Set Tandem	WHEELS: Fork: Number in Each Fork or Trail	WHEELS: Fork: Diameter (In.)	Line Number
Auto-Lite		12	App	2.5	4	GS	GS	Y	2	12				1
Auto-Lite		12	App	2.5	4	GS	GS	Y	2	12				2
Auto-Lite		12	App	2.5	4	GS	GS	Y	2	12	N	2	3¼	3
Auto-Lite		12	App	2.5	4	GS	GS	Y	2	12	N	2	3¼	4
	¾	12	(29)	2.2	5	25	4¾	Y	1	9½x5x5	Y	(30)	3¼	5
Electric Specialty				5.5	2		10	Y	2	16				6
Electric Specialty				5.0	2¼		10	Y	2	20				7
Electric Specialty				5.0	2½		10	Y	2	20				8
Electric Specialty				4.5	4		10	Y	2	20				9
Electric Specialty				4.0	5		10	Y	2	20				10
Electric Specialty				5.5	3½		10	Y	2	22				11
Electric Specialty				5.0	3½		10	Y	2	20				12
Electric Specialty				5.0	3½		10	Y	2	22				13
AL MCP4002	1	12	450	2.0	5		5	Y	1	10½				14
AL MCP4002	1	12	450	2.0	5		3¾	Y	1	10½				15
AL MCP4002	1	12	450	2.0	7		5	Y	1	10				16
AL MCP4002	1	12	450	2.0	7		3¾	Y	1	10				17
AL MCP4002	1	12	450	2.0	5		5	Y	1	10	N	2	3¼	18
AL MCP4002	1	12	450	2.0	5		3¾	Y	1	10½	N	2	3¼	19
AL MCP4002	1	12	250	2.0	5		5	Y	1	10½				20
AL MCP4002	1	12	250	2.0	5		3¾	Y	1	10½				21
AL MCP4002	1	12	250	2.0	3		5	Y	1	10½	N	2	3¼	22
AL MCP4002	1	12	250	2.0	3		3¾	Y	1	10½	N	2	3¼	23
AL MCP4002	1	12	450	2.0	4			Y	1	10x5	Y	2	3¼	24
AL MCP4002		12		2.0	5			Y	1	10½				25
		12		4.0	5		27	Y	1	10				26
		12		4.0	5		24	Y	1	10	Y	2	3¼	27

ABBREVIATIONS

- ▲—Standard.
- (2)—6, 7, 9 or 11.
- (20)—10, 11, 13 or 15.
- (31)—2¼ to 3¼.
- (32)—6⅝, 7, 9 or 11.
- (33)—2¼ to 2¾.
- (38)—7 to 11.
- (39)—10 to 14.
- **AL**—Electric Auto-Lite Co.
- **E-G**—Electric or gas-electric.
- **EM**—Electric motor.
- **Hyd**—Hydraulic.
- **Lin**—Linkage.
- **N**—No or none.
- **R**—Rides.
- **Var**—Variable.
- **W**—Walks.
- **Y**—Yes.

Hyster Co.
P. O. Box 4318, Portland 8, Ore.

Kalamazoo Mfg. Co.
1827 Reed St., Kalamazoo, Mich.

Kwik-Mix Co., Sub. of Koehring Co.
3025 W. Concordia Ave., Milwaukee 16, Wis.

Lewis-Shepard Products, Inc.
227 Walnut St., Watertown 72, Mass.

Lift Trucks, Inc.
2425 Spring Grove Ave., Cincinnati 14, Ohio

Market Forge Co.
35 Garvey St., Everett 49, Mass.

The Mercury Mfg. Co.
4044 S. Halstead St., Chicago 9, Ill.

Peterbilt Motors Co. (MacDonald)
107000 MacArthur Blvd., Oakland 5, Calif.

The Raymond Corp.
17503 Madison St., Greene, N. Y.

Revolvator Co.
8739 Tonnele Ave., North Bergen, N. J.

Ross Carrier Div., Clark Equipment Co.
2nd & Miller Sts., Benton Harbor, Mich.

Silent Hoist & Crane Co.
841 Sixty-Third St., Brooklyn 20, N. Y.

Towmotor Corp.
1226 E. 152nd St., Cleveland 10, Ohio

Transitier Truck Co.
2477 N.W. 23rd Ave., Portland 10, Ore.

Whiteman Mfg. Co.
3249 Casitas Ave., Los Angeles 39, Calif.

The Yale & Towne Mfg. Co.
Roosevelt Blvd. & Haldeman Ave., Philadelphia 15, Pa.

The complete names and addresses of all manufacturers of powered industrial trucks, as well as other equipment, tools and supplies vital to the science of physical distribution, are listed in the Where-to-Buy section of the February issue of DISTRIBUTION AGE, on Pages 73 to 128.

DA INDUSTRIAL TRUCK SPECIFICATIONS — 1955-56

INDUSTRIAL TRUCKS—

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Drawbar Pull (lbs)	Trailing Load—Dry Level Concrete (Tons)	Weight—Excluding Battery	OPERATOR		Motive Power	MOTOR OR ENGINE		BATTERY		DIMENSIONS						3 or 4 Point Suspension
					Rides or Walks	Sits or Stands		Make and Model	Horsepower	Normal Voltage	Ampere Hours	Wheelbase	Length—Overall	Width—Overall	Height, to Steering Wheel	Under-clearance: At Truck Center	Under-clearance: Lowest Point	
1	Atlas 2-WT-2	2500	50	4900*	R		E-G	Own 1175	5	48	306	45½	72	42	60		7½	4
2	3-DWT-2	2100	40	4025*	R		E-G	Own 1175	5	36	306	45½	72	42	60		7½	3
3	Automatic FT	250	7	785*	R	S	EM	Auto-Lite	1½	24		30	48½	29	51¾	33¼		3
4	FT-E	250	7	855*	R	St	EM	Auto-Lite	1½	24		25	52	29		33¼		3
5	BTN	600	17	4650*	R	S	EM	Own		36		41	68	36		6		3
6	MN	725	20¾	5300*	R	S	EM	Own		48		40	75½	40	57	33⅜		4
7	BTW	600	17	5840*	R	S	EM	Own		36		67		42		6		4
8	TR	100	2¾	1080	W		EM	Auto-Lite	1½	12		23½	38¾	30	50	25⅝		3
9	TRH	200	5¾	1640	W		EM	Auto-Lite	1½	12		31	47⅞	32	54	25⅝		3
10	TRLE	100	2¾	840	W		EM	Auto-Lite	1½	12		37⅝	49⅜	30	50	25⅜		3
11	Barrett RX-24	200	5	1400	RW	St	EM	Own	1	24	(1)	32½	47¼	27½	55¼	31½	3	3
12	DX-12	200	5	940	R	S	EM	Own	1	12	(2)	24	41½	26¾	43⅞	31½	3	3
13	SX-24	200	5	1400	R	St	EM	Own	1	24	(1)	32½	47¼	27½	55¼	31½	3	3
14	TX-12	200	5	910	W	St	EM	Own	1	12	(2)	24	41½	26¾	59¼	31½	3	3
15	Buda HB-75	7500		12200	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
16	HB-90	9000		13200	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
17	HA-75	7500		12400	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
18	HAD-75	7500			R	S	DE	Own 6BD-230	60			72	125½	70⅜	66	14		4
19	HA-90	9000		13400	R	S	GE	Own 6B-230	74			72	125½	70⅜	66	14		4
20	HB-120	12000		15780	R	S	GE	Own 6B-230	74			72	125½	86	66	14		4
21	HA-120	12000		15980	R	S	GE	Own 6B-230	74			72	125½	86	66	14		4
22	T6-24	2400		3250	R	S	GE	Own 4B-153	49			45	81¾	42	62	8¾		4
23	TD-24	2400		3350	R	S	DE	Own 4BD-153	40			45	81¾	42	62	8¾		4
24	T6-30	3000		4200	R	S	GE	Own 4B-153	49			45	81¾	42	62	8¾		4
25	TD-30	3000		4300	R	S	DE	Own 4BD-153	40			45	81¾	42	62	8¾		4
26	JG230	4500		5735	R	S	GE	Own 6B-230	74			62	102	66	62	9½		4
27	JD230	4500		5880	R	S	DE	Own 6BD-230	60			62	102	66	62	9½		4
28	JG230N	3000		4215	R	S	GE	Own 6B-230	74			62	102	58	62	9½		4
29	JD230N	3000		4315	R	S	DE	Own 6BD-230	60			62	102	58	62	9½		4
30	JG230P	3000		4155	R	S	GE	Own 6B-230	74			62	102	58	62	9½		4
31	JD230P	3000		4245	R	S	DE	Own 6BD-230	60			62	102	66	62	9½		4
32	JG230WN	4500		6580	R	S	GE	Own 6B-230	74			62	102	66	62	9½		4
33	JD230WN	4500		6670	R	S	DE	Own 6BD-230	60			62	102	66	62	9½		4
34	JG230WL	5000		6455	R	S	GE	Own 6B-230	74			85	125	58	66	8		4
35	JD230WL	5000		6545	R	S	DE	Own 6BD-230	60			85	125	58	66	8		4
36	JG230PLS	3800		4815	R	S	GE	Own 6B-230	74			93	142	64	63	8		4
37	JD230PLS	3800		4960	R	S	DE	Own 6BD-230	60			93	142	64	63	8		4
38	JG230PLD	4400		5635	R	S	GE	Own 6B-230	74			93	154	64	65	8		4
39	JD230PLD	4400		5780	R	S	DE	Own 6BD-230	60			93	154	64	65	8		4
40	Clark CKE-5	500	10	1850	RW		GE	Con N-62	15			34	62⅝	29	54¼	6⅜	2¼	3
41	CK-20	2000	40	3200	R		GE	Con Y-112	30			40	68	39	54½	8⅝	3½	4
42	CK-26	2600	52	3400	R		GE	Con Y-112	30			40	68	39	54½	8⅝	3½	4
43	CT-21	2100	42	3085	R		GE	Chr IND-5	61			57	94	52	58½	11	5¼	4
44	CT-30	3000	60	3685	R		GE	Chr IND-5	61			59	100	52	57	11	5¼	4
45	CT-40	4000	80	4735	R		GE	Chr IND-5	61			59	100	65½	57	11	5¼	4
46	CT-46	4600	92	6200	R		GE	Chr IND-5	61			59	100	65½	57	11	5¼	4
47	CT-120	12000	240	15500	R		GE	Chr 16-A	114			69	122½	92	54	8¼	7	4
48	Tugger	200		1365	RW	St	EM			12		33⅛	60¾	32	43	4⅜		3
49	Crescent JW-1.5	1500	5	1600	R	S	EM	Star Kimble		32	Var	32	56	33	51	6	6	4
50	JW-2	2000	7½	2800	R	S	EM	Star Kimble		36	Var	40	68	40	61½	6	6	4
51	MW-3	3000	10	3200	R	S	EM	Star Kimble		36	Var	45	79	42	61½	6	6	4
52	MW-4	4000	14		R	S	EM	Star Kimble		36	Var					6	6	4
53	HH 1728	2600		4000	R	S	GE	Her IXBER				45	80†	45	58			4
54	CC-47	4000		5000	R	S	GE	Chr				60	97†	60	60			4
55	Hyster Tug	540	27¼	1180	R	St	GE	Wis AKN	6			36	74	42	50	6	6	3
56	Kalamazoo 3600	1200	20	1850	R		GE	Wis TF	14½			51¼	84	42	48	7½	3	3
57	Lewis-Shepard J6T	600	6	1500	R	S	EM	General Electric		12	(3)	29⅜	48¾	32	51¾	3	3	3
58	E6T	750	7½	1800	RW	St	EM	Auto-Lite		12	(3)	30	44½	32	54	3	3	3
59	Lift Trucks KT	(4)		1200	W		EM	Bal 182-D	¾	12	306	24½	42	26½	50¾	23¼	23¼	4
60	KTS	(4)		1150	W		EM	Bal 182-D	¾	12	300	19¼	36¾	32¾	50¾	23¼	23¼	4
61	KTRS	(4)		1400	R		EM	Bal 182-D	¾	12	300	27½	45	32¾	44	23¼	23¼	4
62	Market Forge ST-1000	1000	10	825	R	S	E-G	Bal 183-D	1	12	(5)	25¼	48	30	45	5⅛	1¾	3
63	UT-1000	1000	10	825	R	St	E-G	Bal 183-D	1	12	(5)	38½	58½	30	45	4	1¾	
64	Mercury A-440	2300	60	3000	R	S	GE	Wau FC-90	30			41⅝	70¾	40	56	10	4	3
65	A-440	2600	65	3600	R	S	GE	Wau FC-90	30			41⅝	70¾	40	56	10	4	3
66	A-452	4000	100	4800	R	S	GE	Chr 8A-114	70			60	102	50	66	11	9	4
67	A-452	5000	125	6000	R	S	GE	Chr 8A-114	70			60	102	67	66	10	9	4
68	A-460	2400	60	3200	R	S	GE	Waukesha	30			40	78	41	56	7¼	4	4
69	A-460	3000	75	4000	R	S	GE	Waukesha	30			40	78	41	56	7¼	4	4
70	A-550	2500	60	2900	R	S	EM	Own		36	(11)	45	76	41	64	8½	4	4
71	A-560	1000	25	1450	R	S	EM	Own		36	300	41	70	34	51½	8	3¾	3
72	A-800	5500	135	5400	R	S	EM	Own		48	(12)	60	94	44	66½	8	4	4
73	A-750	3000	75	3300	R	S	EM	Own		36	(12)	48	86⅛	42	52	5	5	3
74	Payloader TC-60	6000	150	7800	R	S	GE	Int 240	67	6	100	70	116	66	58¾	6½	6¼	3
75	TU-80	8000	200	11000	R	S	GD	Her QXLD	75	12	150	79	143	80	61	14	12	3
76	TM	16000	400	25000	R	S	GD	Her JXLD	108	12	150	86	182	96	80	22	16	3
77	Revolvator 52-30	700	Var	1450	W		EM	Auto-Lite		12	App	Var	Var	32	50		3½	4
78	Towmotor K5-30	3000	73	3600	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
79	K5-33	3300	80	3990	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
80	K5-36	3600	88	4260	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
81	K5-40	4000	98	4680	R	S	GE	Con F-162	41			36½	67†	40½	54	8	3½	4
82	Yale & Towne K24JS	3000		3100	R	S	E-G	Electric Specialty				39½	67	39½		8½		4
83	K24DT	2000		2650	R	S	E-G	Electric Specialty				42½	72	40½	60	8½		4
84	MT	(14)	4	1470	W		E-G	AL MCP4002	1	12	450	30	48½	32¾		2¾	2¾	3
85	MSGT	(14)	4	990	W		EM	AL MCP4002	1	12	400	42¼	57⅞	31		1¼	1¼	3

TOWING TRACTOR TYPE

A multitude of variations are available from any of the companies listed.

TURNING RADIUS (Ins.)			SPEEDS						GRAD-ABILITY Per Cent			TIRES				
					Unloaded		Loaded					Type		Sizes		
Outside	Inside	Intersecting Aisle	No. of Forward	No. of Reverse	Forward (mph)	Reverse (mph)	Forward (mph)	Reverse (mph)	Unloaded	At Rated Load	Coupler	Steering Wheels	Driving Wheels	Steering Wheels	Driving Wheels	Line Number
90		68	3	3	7.0	7.0	3.5	3.5	47	5	Var	So	So	15x3½	20x5	1
63½		63½	3	3	7.0	7.0	3.5	3.5	50	5	Var	So	So	15x3½	20x5	2
48		37	3	3	4.8	4.8	2.4	2.4			P	Cu	Cu	10½x5	17x4½	3
37	0	36	3	3	4.8	4.8	2.4	2.4			P	Cu	Cu	10½x5	17x4½	4
60	0	50	4	4	7.2	7.2	4.6	4.6			P	So	So	15x3½	20x5	5
81	30	59	4	4	7.5	7.5	4.8	4.8			P	So	So	20x4	20x5	6
107	46	47	4	4	8.3	8.3	5.7	5.7			P	So	So	20x6	16x4	7
			2	2							AJ	Cu	So	10½x5	10x5	8
			2	2							AJ	Cu	So	10½x5	10x5	9
			2	2							N	So	So	10x5	5½x4½	10
38¼		41	4	3	6.2	4.0	3.2				Un	So	So	10x5	7x2½	11
30		48	2	2	3.2	3.2	1.6		24	8	Un	So	So	10x5	9x4	12
38¼		41	4		6.2	4.0	3.2				Un	So	So	10x5	7x2½	13
30		48	2	2	3.2	3.2	1.6		24	8	Un	So	So	10x5	9x4	14
184	76	103	4	1	15.0						Opt	Pn	Pn	7.00/16	8.25/20	15
184	76	103	4	1	15.0						Opt	Pn	Pn	7.00/16	8.25/20	16
184	76	103	4	1	15.0						Opt	Pn	Pn	7.00/16	8.25/20	17
184	76	103	4	1	15.0						Opt	Pn	Pn	7.00/16	8.25/20	18
184	76	103	4	1	15.0						Opt	Pn	Pn	7.00/16	8.25/20	19
184	65	114	4	1	11.0						Opt	Pn	Pn	7.00/16	8.25/20	20
184	65	114	4	1	11.0						Opt	Pn	Pn	7.00/16	8.25/20	21
101¼	43¼	64⅞	3	1	14.0						Opt	Pn	Pn	6.00/9	6.00/16	22
101¼	43¼	64⅞	3	1	14.0						Opt	Pn	Pn	6.00/9	6.00/16	23
101¼	43¼	64⅞	3	1	14.0						Opt	Pn	Pn	6.00/9	6.00/16	24
101¼	43¼	64⅞	3	1	14.0						Opt	Pn	Pn	6.00/9	6.00/16	25
118	35	87	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	26
118	35	87	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	27
118	39	82¾	4	1	26.7						Un	Pn	Pn	6.00/9	7.50/16	28
118	39	82¾	4	1	26.7						Un	Pn	Pn	6.00/9	7.50/16	29
118	39	82¾	4	1	26.7						Un	Pn	Pn	6.00/9	7.50/16	30
118	35	87	4	1	26.7						Un	Pn	Pn	6.00/9	7.50/15	31
118	35	87	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	32
118	35	87	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	33
148	63½	96	4	1	26.7						Un	Pn	Pn	6.00/9	7.50/16	34
148	63½	96	4	1	26.7						Un	Pn	Pn	6.00/9	7.50/16	35
166	74	103¾	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	36
166	74	103¾	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	37
166	74	104½	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	38
166	74	104½	4	1	25.0						Un	Pn	Pn	6.00/9	6.50/16	39
50		41½	1	1	6.5	7.2			20		Opt	Cu	Cu	13x3½x8¼	16¼x4x11½	40
62		52	3	1	10.0	2.3			20	3	Opt	Cu	Cu	14x4½x8	21x5x15	41
62		52	3	1	10.0	2.3			20	5	Opt	Cu	Cu	14x4½x8	21x5x15	42
108			3	1	12.8	3.0			14	7	Opt	Pn	Pn	6.00/9	6.00/16	43
118			3	1	12.8	3.0			14	7	Opt	Pn	Pn	6.00/9	7.50/16	44
120			3	1	12.0	2.8			14	8	Opt	Pn	Pn	6.00/9	6.50/16	45
120			3	1	12.0	2.8			14	5	Opt	Pn	Pn	6.00/9	6.50/16	46
127			4	1	16.3	2.7			20		Au	Pn	Pn	7.50/15	8.25/20	47
48½	16⅛	46	2	2	3.2	3.2	2.3	2.3			AJ	Pn	Cu	10x4x6¼	10½x6x5	48
49		46	4	4	7.0	7.0	4.0	4.0	15	5	Opt	So	So	12x3½	16x4	49
70	13	30	4	4	7.0	7.0	4.0	4.0	15	5	Opt	SCP	SCP	16x4x11	20x4x16	50
98	37	72	4	4	6.0	6.0	5.0	5.0	15	5	Opt	SCP	SCP	15x5x11¼	20x5x16	51
			4	4	6.0	6.0	5.0	5.0	15	5	Opt	SCP	SCP			52
			4	1	25.0						Opt	Pn	Pn	6.00/9	6.00/16	53
			4	1	25.0						Opt	Pn	Pn	6.00/9	6.50/16	54
51	0	55	Var	Var	12.0	12.0	8.0	8.0	32		Un	Cu	Pn	16¼x4	4.00/18	55
71	2½		3	1	10.0	2.0	10.0	2.0			Opt	Cu	Cu	15½x5x10	15½x5x10	56
42½			2	2	3.4	3.4	2.8	2.8	15	10	Opt	Cu	So	10½x6	9x5	57
38½			2	2	3.2	3.2	2.6	2.6	15	10	Opt	Cu	So	10½x6	9x5	58
			2	2	3.0	3.0	2.0	2.0			Opt	So	So	10x3	10x3	59
			2	2	3.0	3.0	2.0	2.0			Opt	So	So	10x3	10x3	60
			2	2	3.0	3.0	2.0	2.0			Opt	So	So	10x3	10x3	61
46	3	36	(6)	(6)	5.0	5.0	4.0	4.0	20	10	Opt	Cu	Cu	10½x7	10x7	62
56	6	48	(6)	(6)	5.0	5.0	4.0	4.0	20	10	Opt	Cu	Cu	10½x7	7x5	63
54½			3	1	8.0	2.1	5.1	2.1			Opt	So	Cu	15x5	21x5	64
54½			3	1	8.0	2.1	5.1	2.1			Opt	So	Cu	15x5	21x5	65
120		78	4	1	10.0	2.3	10.0	2.3			Opt	PC	PC	(7)	(9)	66
120		86	4	1	12.5	2.3	10.0	2.3			Opt	Pn	Pn	6.00/9	6.50/16	67
62			3	1	9.0	2.7	5.7	2.7			Opt	PC	PC	(8)	(10)	68
62			3	1	9.0	2.7	5.7	2.7			Opt	PC	PC	(8)	(10)	69
69		64	4	4	6.3	6.3	3.5	3.5			Opt	Cu	Cu	16¼x4	21x5	70
90½		59	3	3	7.0	7.0	4.0	4.0			Opt	So	So	15x3½	18x4	71
100			4	4	6.5	6.5	3.0	3.0			Opt	Cu	Cu	22x6	22x6	72
72			4	4	7.5	7.5	4.2	4.2			Opt	Cu	Cu	15½x6	21x7	73
121	34	92	2	2	16.9		19.0				Un	Pn	Pn	6.00/9	7.50/16	74
238	122	112	4	4	22.0		33.0				Un	Pn	Pn	9.00/20	9.00/20	75
294	149		4	4	17.0		27.0				Un	Pn	Pn	16.00/24	16.00/24	76
		Var	2	2		2.5		2.5		Var	Var	So	So	12x3½		77
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	78
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	79
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	80
64	9½	56	2	2	10.5	9.0					E	Cu	Cu	17x4½	22x8	81
76		57	4	4	6.5	6.5	5.5	5.5			Opt	Cu	Cu	16¼x5x11¼	21x5x16	82
61½		55	4	4	7.5	7.5	5.5	5.5			Opt	Cu	Cu	16x3½	20x5	83
43¼		43¼	2	2	3.0	3.0	2.0	2.0	10	5	Opt	Cu	Cu	10½x5	10½x5	84
			2	2	3.0	3.0	2.0	2.0	5	3	GT	Cu	Cu	10½x5	10½x5	85

ABBREVIATIONS

*—Including battery.
†—Not including towing eyes.
(1)—250 to 275
(2)—250 to 450.
(3)—300 to 360.
(4)—200 to 500.
(5)—340 to 500.
(6)—Two standard; three optional
(7)—6.00/9 or 21x5.
(8)—4.00/8 or 16¼x4.
(9)—7.00/16 or 28x7.
(10)—4.50/12 or 21x5.
(11)—450 to 550.
(12)—550 to 600.
(14)—200 to 700.
AJ—Automatic jaw.
AL—Electric Auto-Lite Co.
App—Appropriate.
Au—Automatic.
Bal—Baldor Co.
Chr—Chrysler Corp.
Con—Continental Motors Corp.
Cu—Cushion.
DE—Diesel engine.
E—Eye.
E-G—Electric or gas-electric.
EM—Electric motor.
GE—Gasoline engine.
GD—Gasoline or diesel engine.
GT—Grip tow.
Her—Hercules Motors Corp.
N—No or none.
Opt—Optional.
P—Pin.
PC—Pneumatic or cushion.
Pn—Pneumatic.
R—Rides.
RW—Rides or walks.
S—Sits.
SCP—Solid, cushion or pneumatic.
So—Solid.
St—Stands.
Un—Universal.
Var—Various.
W—Walks.
Wau—Waukesha Motor Co.
Wis—Wisconsin Motor Co.

POWERED END-LOADING (STRADDLE) CARRIERS

Due to space limitations basic models only are shown for each company represented.

Line Number	MAKE AND MODEL	Maximum Load Cap. (Lb.)	Load Space* (In.)		Package Size* (In.)		Service Weight (Lb.)	Power Type	Hoist Mechanism	Overall Dimensions (In.)			Frame Length	Wheel Base	Wheels				Turning Radius (In.)				Load Shoes				Bolster Width (Athwart Track)	Engine**		Trans-mission		Running Speeds (mph)		Line Number
			Inside Height	Inside Width	Width	Height				Length	Height to Top of Steering Wheel	Width			Number Steer	Number Drive	Tire Sizes Front	Tire Sizes Rear	Without Load Inside	Without Load Outside	With Frame-Length Load Inside	With Frame-Length Load Outside	Length (In.)	Width of Face (In.)	Maximum Lift (from Ground)	Shoes Swing† (Yes or No)		Make and Model	Horsepower	Number Speeds Forward	Number Speeds Reverse	Maximum Forward Unloaded	Maximum Forward with Maximum Load	
1	Gerlinger....4MH	14,000	66	57	52	54	10,600	G	RP	150	110	92⅜	142	110	4	2	9.00x20	9.00x20	116	116	116	.....	124	6	28	No	51	Ford...JG-OHV	130	4	4	25-30	25-30	1
2	.....SMH	14,000	66	57	52	54	11,100	G	RP	.....	115	86	168	136	4	2	9.00x20	9.00x20	138	138	138	.....	96	6	16	Yes	51	Ford...JG-OHV	130	4	4	25-30	25-30	2
3	.....RM-20	20,000	70	57	52	58	11,750	G	RP	150	122	92⅜	142	110	4	2	9.00x20	9.00x20	116	116	116	.....	124	6	28	No	51	Ford...JG-OHV	130	4	4	25-30	25-30	3
4	.....SM-20	20,000	70	57	52	58	12,000	G	RP	176	119	86	168	136	4	2	9.00x20	9.00x20	116	116	116	.....	124	6	28	No	51	Ford...JG-OHV	130	4	4	25-30	25-30	4
5	.....4H	30,000	78	69	64	66	14,300	G	RP	173	132	111½	162	130	4	2	11.00x20	11.00x20	138	138	138	.....	96	6	16	Yes	51	Ford...JG-OHV	130	4	4	25-30	25-30	5
6	.....SRH	30,000	78	69	64	66	15,100	G	RP	187	130	106	176	144	4	2	11.00x20	11.00x20	143	.....	143	.....	140	6	26	No	66	Ford...J-OHV	170	4	4	30-35	30-35	6
7	.....(Pivot Fork) PF-20	20,000	78	69	64	66	16,500	G	RP	187	130	106	176	156	4	2	11.00x20	11.00x20	162	.....	162	.....	99	6	16	Yes	66	Ford...J-OHV	170	4	4	30-35	30-35	7
8	.....SC-50‡	50,000	72	62	58	60	27,800	G or D	Hyd	212¼	††	110½	.....	162	4	2	14.00x20	14.00x20	162	162	162	.....	***		16	Yes	No B	Ford...J-OHV	170	4	4	30-35	30-35	8
9	Hyster.....MD	20,000	81	57	52	66	10,950	G	C	176	125	90¾	160	136	4	2	9.00x20	9.00x20	122	209	147	234	95	5¼	21†	Yes	51	Her...JXE-3	91	4	4	30	30	9
10	.....MH3	30,000	79¼	45	100	108	12,000	G	C	191	117¾	79	173½	148	4	2	11.00x20	11.00x20	161	260	161	260	102	5¼	22†	Yes	42	Inter...BD-269	101	5	5	35	35	10
11	.....MHS	30,000	77¼	68	64	66	15,150	G	C	202	129¾	99½	173½	148	4	2	11.00x20	11.00x20	161	260	161	260	94¾	5¼	22†	Yes	42	Inter...BD-269	101	5	5	35	35	11
12	Ross Div. (Clark)....70-6657	10,000	66	57	52	54	7,500	G	H	130	101	86	.....	76	2	2	7.50x15	9.00x20	76	180	76	180	99	6	12	No	54	Her.....6 cyl.	112	2	2	25	25	12
13	81-7256	20,000	72	56	52	60	10,300	G	H	180	114	90	.....	138	4	2	10.00x20	10.00x20	127	228	127	228	94	6	18	Yes	54	Her.....6 cyl.†	112	4	4	40	50	13
14	91-7056	30,000	70	56	52	58	12,600	G	MC	187	115	92	.....	144	4	2	11.00x20	11.00x20	142	252	142	252	99	6	21	Yes	54	Her.....6 cyl.	110 or 140	4	4	40	40	14
15	95-7256	40,000	72	56	52	60	16,650	G or D	Hyd	200	117	94	.....	156	4	2	11.00x20	11.00x20	.....	.....	.....	.....	108	6	21	Yes	54	Her.....6 cyl.	140	4	4	40	40	15
16	99-14498	30,000	144	98	84	123	23,700	G	MC	200	198	149	.....	146	4	2	14.00x24	14.00x24	.....	.....	.....	.....	204	6	40	Yes	96	Her.....6 cyl.	140	4	4	35	35	16
17	100-7262	50,000	72	62	58	60	20,300	G or D	Hyd	210	117	107	.....	162	4	2	14.00x20	14.00x20	122	252	122	252	114	6	25	Yes	60	Her.....6 cyl.	140	4	4	25	25	17
18	81-7256	20,000	72	56	52	60	11,300	G	H	180	114	90	.....	138	4	2	10.00x20	10.00x20	127	228	127	228	91	6	18	Piv	No B	Her.....6 cyl.	140	4	4	30	30	18
19	81-7856	20,000	78	56	52	66	12,000	G	H	188	120	96	.....	138	4	2	10.00x20	10.00x20	127	228	127	228	91	6	18	Yes	51	Her.....JXO†	112	4	4	50	40	19
20	.....§621-5756	20,000	55	56	(5)	50	15,500	G-E	E	164	104	98	.....	99	2	2	36x12x30	28x7x22	46	178	46	178	96	6	66	(2)	(2)	Her.....JXO†	112	4	4	50	40	20
21	.....§621-5748	20,000	57	48	44	52	13,000	G-E	E	160	103	89	.....	99	2	2	36x12x30	28x7x22	46	174	46	174	81	6	13	(3)	(2)	RPr.....	L-2	.....	.....	10	4-8	21
22	.....§641-5746	20,000	58	46	(6)	54	18,000	G-E	H	160	104	88	.....	99	2	2	36x12x30	28x7x22	47	166	47	166	(1)	6	12	(4)	(2)	RPr.....	L-2	.....	.....	10	4-8	22

SYMBOLS

* All manufacturers listed have indicated that load space and package size can be manufactured to customer's specifications

** All engines used in these models are water cooled

*** 2½ by 6 by 38

† This model also available with Ford V-8 engine in 130 hp

†† Also available in rigid shoe design

†† Height to top of cab, 148½ in.

§ These units available in 30,000-lb cap. also

(1) 3—Independent operations, 2' 8" each

(2) Traversing—14" to 54"

(3) No—46"

(4) Traversing—15" to 46"

(5) 12 to 52

(6) 15 to 42

ABBREVIATIONS

C—Chain

Cont—Continental

D—Diesel

E—Electric

G—Gas

G-E—Gas-Electric

GorD—Gas or Diesel

H—Hydraulic

Her—Hercules

Inter—International

MC—Mechanical Chain

NoB—No Bolster

RP—Rack Pinion

RPr—Ready Power

Specifications Reprints

This entire Industrial Truck Specifications and Materials Handling Statistics section, from Pages 83 to 106, is being reprinted in booklet form. The 24-page, stiff-cover booklet is being made available at 75¢ a copy. Some 4,500 of the 1954-55 Specifications and Handling Equipment Guide reprints were distributed last year to traffic managers, warehousemen, handling and packaging engineers, and others engaged in the business of physical distribution. Write for quantity lot prices. Send your orders to:

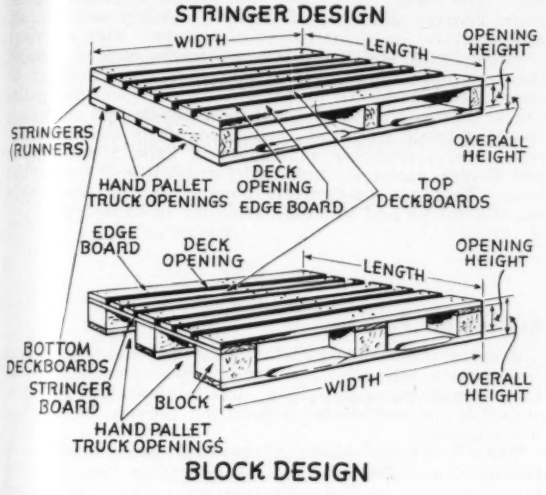
The Publisher
DISTRIBUTION AGE
Chestnut & 56th Streets
Philadelphia 39, Pa.

Wooden Pallets

Construction, Style and Design*

Principles of Pallet Construction

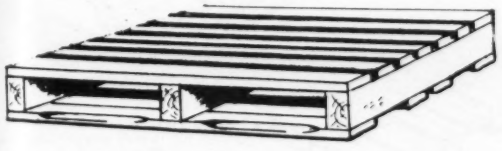
When planning a pallet program, an important step is to select the proper pallet. In order to do this, it is necessary to gain an understanding of the basic wooden pallet construction principles. This section deals briefly with a description of the principal parts of pallets and variations in construction details, known in the trade as details of design, style, and construction.



Principal Parts of Woden Pallets

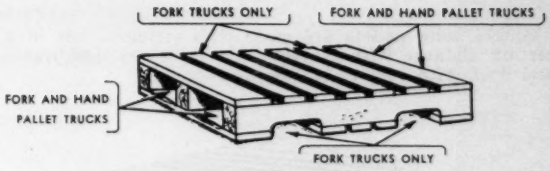
Principles of Pallet Design

There are two designs of wooden pallets in general use. The 2-way pallet permits entry of fork or hand truck from two sides only, and in opposite directions.

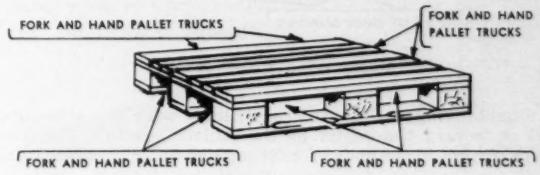


Typical 2-Way Pallet Design

The 4-way pallet permits entry of handling equipment from four sides. They may be designed in two different ways. The notched stringer design allows 4-way entry only with fork-lift trucks, and 2-way entry with hand pallet trucks. Block design allows 4-way entry of both fork-lift and hand pallet trucks.



Typical 4-Way Notched Stringer Design



Typical 4-Way Block Design

Principles of Pallet Style

The two styles of wooden pallets are described below. Single-face pallets have only one deck, which is the top surface.

Typical Single-Face Style

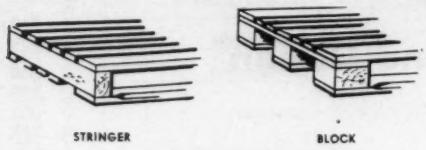
Double-face pallets have two decks forming the top and bottom surfaces. The bottom deck helps distribute the load when tiered, and adds strength to the pallet by helping tie the stringers together. Double-face pallets usually are manufactured in one of two forms. Reversible pallets, as the name implies, have identical top and bottom decks. Goods may be stacked on either deck. Non-reversible pallets have top deckboards more closely spaced than those on the bottom deck. The wider spacing arrangements of the bottom deckboards permits the use of hand pallet trucks, or it is utilized to reduce the amount of lumber in the pallet, giving a consequent saving in weight and cost while still retaining the other physical advantages of double-face pallets.

Double-Face, Non-Reversible Pallet

Features of Construction

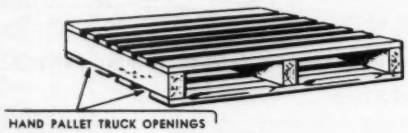
The three principal construction features also serve to classify wooden pallets. Flush stringer pallets are constructed with runners or blocks built flush with the ends of the deckboards.

*Material on this and the following page is excerpted from the book, "Pallets and Palletization," published by the National Wooden Pallet Manufacturers Association, Barr Building, Washington 6, D. C. Copies of this complete handbook on wooden pallet construction and usage are available from the NWPMA at $1 each.



Flush Pallets Using Stringers and Blocks

Single wing pallets are made with stringers set in a certain distance with respect to ends of top deckboards and flush with ends of bottom deckboards.



Single Wing Construction

Double wing pallets are constructed with the stringers set in toward the center of the pallet a certain distance with respect to the ends of both top and bottom deckboards.

Double Wing Construction

Special Purpose Pallets

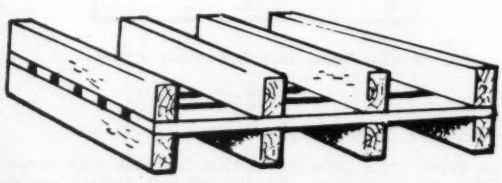
Unlike permanent or returnable warehouse pallets for which National Wooden Pallet Manufacturers Association (NWPMA) specifications set forth construction features in detail, special purpose pallets may be of any design and style and contain any construction features necessary to assure proper performance under anticipated conditions.

The NWPMA manual emphasizes features of standard pallets, because they are the ones most widely used. Special purpose pallets, however, are necessary for handling low density or highly concentrated loads, items of unusual shape and weight, and materials subject to damage from impacts or superimposed loads. Specifications for special purpose pallets are a matter for agreement between the purchaser and his pallet supplier.

Some of the more commonly used special purpose pallets are described below:

Lightweight reusable pallets are important for handling bulky materials of low density. Examples of this type load are packaged paper products, cellucotton products, light bulbs, radio tubes and empty cans.

Take-It-or-Leave-It Pallets embody a unique method of construction which permits the entry of forks over or under deckboards. This arrangement allows goods to be handled by lift trucks either with or without the pallets. They are employed in operations involving at least one step where goods cannot be handled on pallets, such as a palletized warehouse where merchandise is shipped outbound without pallets. This characteristic which permits unloading without manual handling is the main feature of take-it-or-leave-it pallets.



Take-It-Or-Leave-It Pallet

Pallets for Handling Heavy Items are of particularly rugged construction. They are used in conjunction with such ponderous items as reels of wire and rolls of paper.

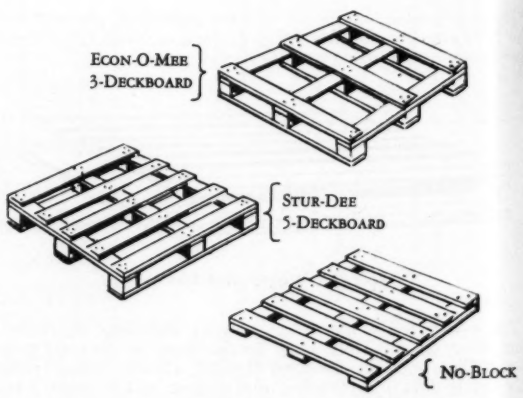
Drum or Beer Keg Pallets, as the names imply, are designed specifically for handling drums and kegs.

Pallet Boxes, Bins and Crates consist essentially of a box, bin or open crate mounted on a pallet base. A pallet box has solid sides and a top, a pallet bin has solid sides but no top, and a pallet crate has open sides and usually no top. All three can be made in either collapsible or non-collapsible form. Collapsible pallet boxes, bins and crates, when knocked down, store easily and ship economicaly on the return leg of interplant movements. Side members of pallet boxes, bins and crates are constructed to support the superimposed weights encountered when tiering; no weight is borne by the load itself. Typical uses for pallet boxes, bins and crates are to store, handle and ship such items as small machined parts, irregularly shaped materials, coarse granular substances in bulk, miscellaneous odd shaped packages, uncrated furniture and automobile tires. They are particularly popular in the automobile manufacturing and wholesale distributing industries.

Expendable Pallets

Because expendable pallets are usually one-trip affairs, cost coupled with adequate strength are essential factors. Like special purpose pallets, details of design and construction are matters for negotiation between buyers and manufacturers.

There are three general types of expendable pallets in common use. Two of these types utilize blocks rather than stringers in their construction to save on weight and lumber content. Block type expendable pallets are generally of 4-way design. Actual dimension of parts depend on shipping loads and transit conditions.



Types of Expendable Pallets

No-Block expendable pallets resemble unitized crate panels in appearance. They are of 2-way design. Because opening heights are small, they are usually handled with saber fork-lift truck attachments.

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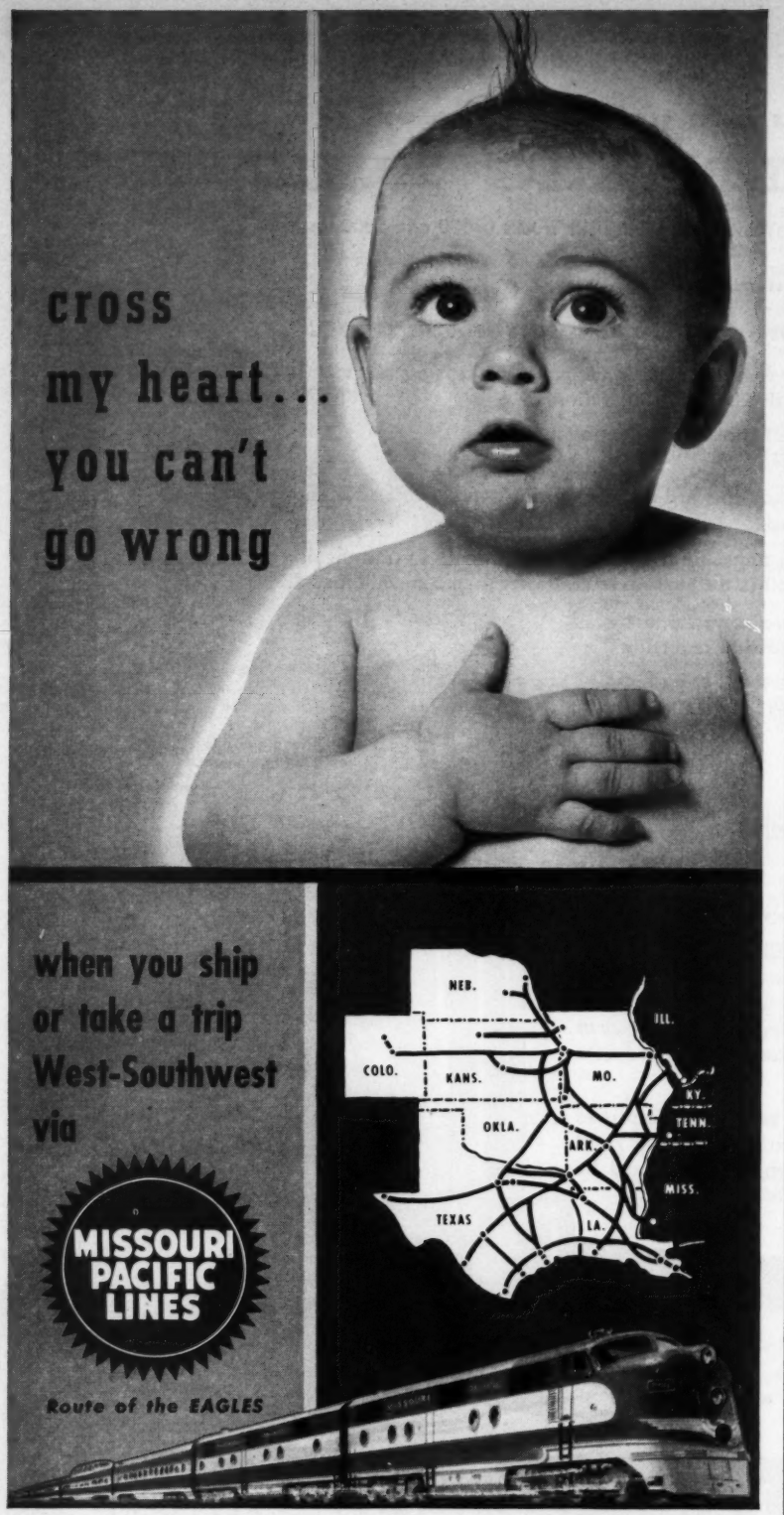

Our Maritime...

(Continued from Page 27)

foreign-flag competition on essential trade routes. The subsidy merely puts the American-flag operator on an equal footing with his foreign competitor. It amounts to the difference in operating costs between the United States vessel and competing foreign vessels.

There are three important facts to remember in viewing the operating differential subsidy program:

1. It recognizes that foreign-flag vessels pay much lower wages to their crew members and provide them with food and living conditions that are substandard when compared to American levels.

2. The subsidy does not guarantee anything beyond putting the American operator on an equal footing with foreign competitors. After receiving the operating subsidy, American operators must depend upon their competitive ingenuity and enterprise to survive and make a profit.

3. The size of operating differential subsidies should not be overestimated. A survey of subsidized steamship lines conducted by the Committee of American Steamship Lines revealed that operating subsidies on the average amounted to only 10 per cent of the lines' yearly income.

Government Requirements

In return for receiving the operating subsidy, an American-flag steamship line must meet certain government requirements as to operations and equipment:

1. It must maintain regularly scheduled service over trade routes determined by our government to be essential to our foreign trade;

2. All ships officers and 90 per cent of the crewmen must be American citizens;

3. Practically all of the equipment, food, supplies and other materials used on its ships must be of American origin;

4. Its ships must be constructed in American shipyards;

5. Safety requirements of the U. S. Coast Guard, the highest standards of maritime safety in the world, must be maintained by the ships it operates;

6. The ships it uses must be retired from active service after 20 years of operation;

7. All of its ships must be registered under the American flag.

The Act also provides that "national defense features" may be incorporated in the design of ships built with construction subsidies. This assures that ships in the American-flag fleet will be readily convertible to military use during a national emergency.

Cost to the Taxpayer

During the first 10 years that the Merchant Marine Act was in effect, operating differential subsidies to American-flag lines totaled $43.3 million. All subsidies were discontinued from 1943 through 1946 when American-flag fleets were requisitioned by the government.

Here, however, a unique provision of the Merchant Marine Act comes into play. Operating differential subsidies are the only government subsidy payments subject to recapture by the government. Subsidized lines must repay to the government 50 per cent of all profits realized from their operations that are in excess of 10 per cent of "capital necessarily employed" up to the amount of the subsidy.

In accordance with this unique recapture clause of the 1936 Act, subsidized lines repaid to the government more than $30 million of the $43.3 million in operating subsidies received from 1937 through 1946. More than 69 per cent of the total subsidy, in other words, was returned to the government during the first 10-year accounting period.

As to the cost of the operating subsidy program since 1947, I will quote Robert B. Murray, Jr., the Undersecretary of Commerce for Transportation, as he discussed it in a recent speech:

"It is generally understood that our merchant marine requires some government assistance, if it is to operate at sufficient strength. However, the fact that this assistance is far less in net amount than actual gross subsidy accruals would indicate, when recapture and taxes are taken into consideration, is frequently overlooked.

"From 1947, when most current operating subsidy contracts became effective, through 1953, the latest year for which operating subsidy has been paid, the total average gross subsidy accrual per year has been $54.8 million. From this amount the government has withheld an average of $14.1 million or about 28 per cent annually, representing estimated recapture accruals resulting from the government's share of net profits earned in excess of the statutory limitation of 10 per cent.

"This brings the total net subsidy payable to $40.7 million annually. In this same period, the subsidized operators paid into the Federal Treasury a total of $82.6 million in taxes, or an average of $11.8 million each year. The average yearly outlay by the government is, therefore, further reduced to about $28.9 million."

These figures do not take into account the individual taxes withheld from seagoing and shoreside labor employed by the subsidized lines, or the taxes that are paid on dividends and profits of suppliers.

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(*Please Turn Page*)

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Our Maritime Policy . . .

(Continued from Preceding Page)

exact figures, it has been conservatively estimated that the total direct and indirect taxes to the U. S. Treasury generated by the operations of the subsidized lines amounts to $310 million for the years 1947 through 1953—or an average of more than $44 million per year.

This is $4 million per year in excess of the $40.7 million average yearly net subsidy payable by the government under the program.

It should be emphasized that the $40.7 million yearly average Mr. Murray gives for the operating subsidy program is the net subsidy payable—not the subsidy paid to the lines. One of the subsidized operator's problems is that the government is somewhat slow in making subsidy payments. Actual subsidies paid have averaged about $29 million per year from 1947 through 1953. However, we must admit that great progress is being made in catching up on the unpaid backlog.

A Look at the Record

Now let us consider what these maritime subsidies have produced.

1. We have today the largest and best merchant marine in our history. At the beginning of 1953, the fleets of subsidized lines consisted of 289 vessels, totaling 3,115,000 tons. When the Merchant Marine Act went into effect, these fleets had only 171 vessels aggregating 1,283,000 tons.

2. The increase in yearly carrying capacity of the subsidized fleet, due to superior performance characteristics and speed, is even more marked, with an estimated cargo carrying capacity more than three times what it was in 1937.

3. The 146 construction-subsidized ships, which were built or were being built in 1942 constituted an important pool of new ships available for national defense at the outbreak of World War II.

4. Subsidized lines have developed and pioneered services in many new and essential trade routes. In doing this they have served as the "spearhead" of American commerce, stimulating and promoting the flow of international goods and services.

Despite the fact that every investigation has resulted in a finding that it is a sound policy—despite the overwhelming evidence pointing to progress under the 1936 Act—despite the millions of dollars that have been saved by the existence of an American merchant fleet—there are still those who say: "Why is it necessary that the United States have a strong fleet of ocean-going ships? Why not let foreign vessels carry our foreign trade, if it is cheaper for them?"

From a military standpoint, this would be a disastrous decision. Ships are—and always will be—the lifeline between the fighting front and our production plants.

From the standpoint of our international trade, dependence upon foreign-flag ocean vessels could endanger the continuous interchange of goods between the United States and its foreign customers and suppliers. Foreign-flag fleets are not regulated as to their routes of service. They can go where the preponderance of cargo is to be found—which makes for erratic, undependable service.

Those American steamship lines operating under the 1936 Act and rigid contract provisions, on the other hand, are required to provide regularly scheduled services over the essential trade routes that they are licensed to serve by the United States Government. This regularity is not only a stabilizing influence in maintaining the present volume of export-import trade—but allows an orderly increase in our international trade.•

(Resume Reading on Page 28)

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Injuries . . .

(Continued from Page 29)

by dock plates, skids, handles or hand trucks, and other warehouse equipment. Nails projecting from barrels, crates, furniture, and other objects may result in punctured hands or fingers. In addition, hands and fingers as well as feet and toes may be crushed under objects as they are being placed or by goods which are dropped.

Unstable piles of goods also are important hazards to warehousemen. Unsafely piled goods in storage may fall on passing workmen without warning, particularly if heavily loaded trucks, used in nearby passageways, cause vibrations within the warehousing structure.

Vehicular hazards are common in warehousing. Blind corners and poor layout of traffic lanes may result in collisions between vehicles or between vehicles and workmen. The practice of loading fork-lift trucks and similar equipment so that the loads block part of the operator's line of vision frequently accents this hazard. In handtruck operations, hands and fingers are often pinched between the handles of the trucks and doorways, piles of material, or other objects.

The possibility of a slip, a stumble, or a fall is high in warehousing. Loose boards, improperly placed cases, crates, or other materials frequently present tripping hazards. Tripping may also result from rough floors in warehouses, railroad cars, and motor trucks. The necessity of working on top of piled materials frequently presents serious possibilities of falls.

Machine hazards are not common in warehouses. However, merchandise and cold-storage warehouses occasionally use belt conveyors to transport goods to storage. Household-goods warehouses may have woodworking machinery for repairing furniture. In addition, most warehouses have some maintenance machinery. The opening and closing of railroad car doors is another common source of injury.

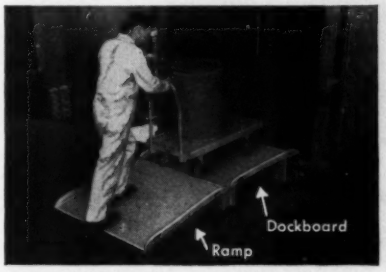
The four general types of warehousing establishments showed great variations in injury experience (Table 1). Average frequency rates ranged from a low of 21.0 for warehousemen of household goods to a high of 39.7 for workers in refrigerated warehouses. In general, the warehouse groups in which the volume of injuries was high tended to have relatively few serious injuries; the reverse was true in those groups which had relatively low frequency rates.

Although refrigerated warehouses as a group had the highest frequency rate, their severity records were the best in the industry. Of the 606 in-

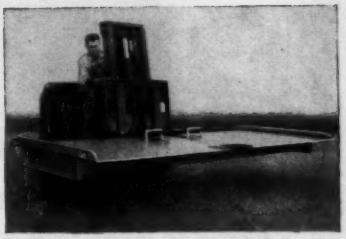
(*Please Turn Page*)

Notice ease with which worker handles this 48" x 60" Magcoa Dockboard.

One-man, "do-it-yourself" handling equipment!



Low dock, high truck . . . requiring a long, easy slope. Magcoa solves it easily with a combination consisting of a Ramp section and a Dockboard section. And each section can be moved by one man. If it had been built as a one-piece unit, it would have been difficult. This way, it's easy . . . and safe.



On big, big ones, like this 90" x 54" Dockboard for use with double-door railroad cars, Magcoa installs retractable lift truck handles . . . however, despite the bulk, final positioning and up-ending can be done manually by one man.

Even the big Magcoa Yard Ramp for trailer and rail loading from ground level can be moved and positioned by one man. Whatever your loading problem, you can count on Magcoa to help you solve it.

What's your loading dock problem?

Your local Magcoa representative can help you solve your loading dock problems, whether "routine" or difficult. A new bulletin shows a variety of dock problems *and solutions*. It's titled, "What to do about Difficult Docks," and is available on request.

MAGNESIUM COMPANY OF AMERICA
Materials Handling Division
EAST CHICAGO 3, INDIANA
Representatives in Principal Cities

For your free copy of "What to do about it" . . . clip this coupon to your business letterhead, print your name clearly, and mail today to Magnesium Company of America, Materials Handling Division, East Chicago 3, Ind.

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Injuries and Accidents . . .

(Continued from Preceding Page)

juries reported by these warehouses, only one resulted in death and only 16 resulted in permanent disability. As a result, injury severity averages were only 39 days lost time per disabling injury and 1.6 days lost per thousand hours worked.

Merchandise warehouses had a frequency rate of 33.0 disabling injuries per million hours worked. Serious disabilities, slightly more frequent than in refrigerated warehouses but about equal to the average for all warehouses, were overbalanced by the relatively high incidence of temporary-total disabilities. Severity records, 64 days lost time per injury and 2.1 days lost per thousand hours worked, were, therefore, somewhat better than the averages for all warehouses.

For general comparisons, warehouse employees were divided into three occupational groups: operators, who comprised 59 per cent of the total reported employ men; materials-movement personnel, 10 per cent; and other occupations (clerical and maintenance), 31 per cent. Seventy-seven per cent of the reported injuries were experienced by operators; 11 per cent by materials-movement personnel, and 12 per cent by the other occupations.

Occupations found almost exclusively in the refrigerated warehouses had the most unfavorable injury-frequency rates. The three highest occupational injury-frequency rates were: 85.9 for coolermen; 76.1 for ice handlers; and 61.7 for freezermen. Handlers and stackers, who had the fourth highest injury rate (51.6), were employed in various types of warehouses, but they averaged 53 injuries per million hours worked in refrigerated warehouses compared with about 28 in merchandise or farm-products warehouses.

Three of the operating occupations had industrywide frequency rates ranging between 30 and 40: General warehousemen, 28.2; packers and crapers, 35.6; and order fillers, 34.6. General warehousemen, the largest occupational group in the industry, are employed in all types of warehouses and their injury experience, consequently, varied as widely. Their frequency rates ranged from 22.9 in farm-products warehouses to 49.7 in merchandise warehouses, averages were 41.7 in refrigerated warehouses and 36.9 in warehouses storing household goods.

The lowest injury-frequency rates for operating personnel were: 13.9 for food processors; 18.9 for refrigerating engineers; and 21.4 for grain elevator men.

Materials Movement

Hand truckers had the highest injury-frequency rates among materials-movement workers. Their average was 44.0 disabling injuries per million hours worked, but among 162 cases no death occurred and only three permanent impairments.

Elevator operators (27.0) and fork-lift operators (26.2) had practically identical injury-frequency rates but the former had the better injury-severity records. Fork-lift operators had four permanent impairments among a total of 51 cases.

Individual case records of 1,604 injuries were collected for detailed analysis. Two of these injuries resulted in death and one in permanent-total disability.

In the detailed group of injuries there were 57 permanent-partial disabilities. Of these, 17 were amputations and 40 were bruises, cuts, strains and fractures which resulted in the loss of use of some body part or function.

Reflecting the large volume of materials handling by warehousemen, four types of injuries accounted for nearly all temporary - total disabilities. Strains and sprains constituted 35 per cent of the temporary injury vol-

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me; bruises and contusions, 30 per ent; cuts, lacerations, and punctures, 5 per cent; and fractures, 13 per ent. Nearly 3 per cent of all tem-orary-total disabilities were hernias. ack, leg, foot, toe, hand, and finger njuries predominated. It would ap-ear, therefore, that more general use f mechanical handling equipment and ider use of personal safety equip-ent would materially reduce the umber of injuries to warehousemen.

Agencies of Injury

Containers, the most frequently isted agency of injury, accounted for early one-third (30.3) of all injuries o warehousemen. These injuries, owever, did not tend to be severe.

Vehicles, second in importance as n agency of injury, produced nearly ne-seventh of all warehousing in-uries. Although generally more evere than container injuries, vehicle njuries were still below average in everity. Hand trucks and similar quipment accounted for 65 per cent f all vehicle injuries. Powered rucks including fork-lift trucks and otor trucks were responsible for 25 er cent and railroad cars for 10 per ent.

Accident Types

More than four-fifths of all injuries esulted from four general types of ccidents: Workmen were struck by oving objects; they strained them-elves while handling materials or quipment; they were caught in, on, r between moving objects; and they ell. The latter two groups accounted or the most severe injuries.

Nearly a third (30.7 per cent) of ll injuries resulted from warehouse-en being struck by moving objects. Most of these originated in manual andling operations and in the use of quipment, especially vehicles and and tools. In nearly 70 per cent of hese cases it was a falling object hich inflicted the injury.

Overexertion, the second most com-on type of accident, accounted for early a fourth (23.4 per cent) of all njuries.

Accident Causes

Two general groups of hazardous orking conditions caused more than 0 per cent of all accidents to ware-ousemen: hazardous working pro-edures, 34.4 per cent; and defects of gencies, 26.0 per cent. Two other roups, improperly guarded agencies nd hazardous arrangement or place-ent of materials accounted for an dditional 33.2 per cent.

Broadly speaking, most of the acci-ents attributed to hazardous work-ng procedures reflect supervisory in-dequacies in the proper planning of anual materials - handling opera-ions.

Accidents ascribed to defective in-ustrial trucks most commonly re-ulted from defects acquired in use

(*Please Turn Page*)

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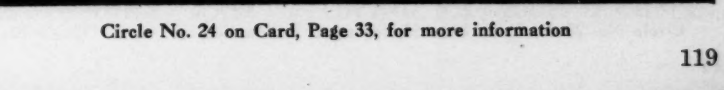

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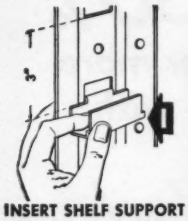
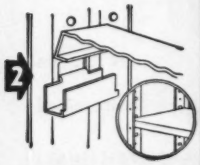
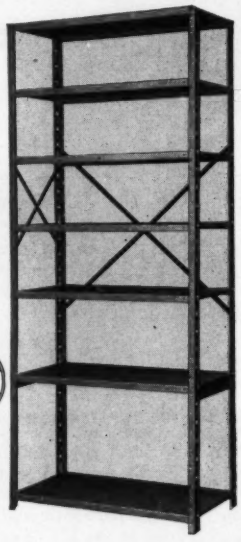


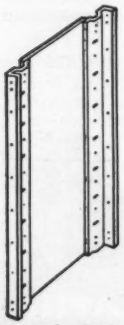
INSERT SHELF SUPPORT BRACKET . . no fumbling with studs, bolts, nuts or lock washers.



TILT SHELF INTO SUPPORT BRACKET . . and you're finished. Shelf is now ready for loading.



Borroughs heavy gauge rolled shaped-post for open shelving gives extra strength, extra value.



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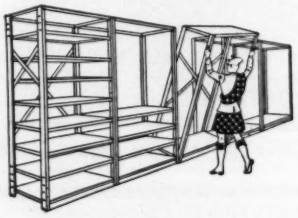

* **Each individual unit is complete in itself . . no part depends on unit next to it . . any unit or shelf can be moved independently.**

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Injuries and . . .

(Continued from Preceding Page)

and permitted to exist because of inadequate maintenance. Defects in the materials handled were a common source of accidents in all types of warehouses. Most frequently these defects consisted of unrepair damage to the containers and bindings of the materials.

In warehousing, as in other industries, the accidents arising from inadequate guarding tend to produce injuries of greater than average severity. Eighteen per cent of the warehousing accidents were directly attributable to inadequate guarding.

Improperly piled or improperly placed materials constitute a prominent hazard in warehousing, particularly in merchandise and household-goods warehouses. Most of the reported accidents, which were attributed to these hazards were cases in which materials fell on workers. In a number of instances the materials fell from completed piles and struck workers who were working nearby or simply passing by the piles. In other instances they fell from warehouse trucks while being moved or slid off the loading docks while being moved into or out of storage.

Two other hazardous working conditions—poor housekeeping and lack of personal safety equipment—accounted for one or every 20 injuries to warehousemen. Most of the latter group were associated with using hand tools and machines.

For the purpose of this analysis, an unsafe act was defined as that "violation of a commonly accepted safe procedure which occasioned or permitted the occurrence of the injury-producing accident. Literally this definition means that no personal action shall be designated unsafe unless there is a reasonable, less hazardous, alternative procedure.

The general types of unsafe acts predominated. Unsafe handling of materials or equipment contributed to the

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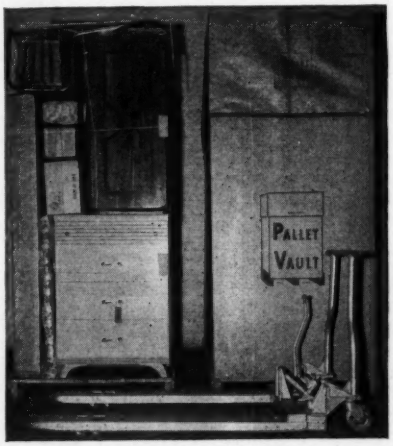

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occurrence of 40.5 per cent of the accidents and assuming unsafe positions or postures contributed to 36.7 per cent. Of somewhat lesser importance, unsafe loading or placing of materials was responsible for 10.1 per cent of the accidents; the failure to secure materials or to warn others of their possible movement was responsible for 4.8 per cent.

To illustrate the more common types of hazards encountered in warehousing operations, a number of typical accidents were selected for specific comment. All available details relating to the occurrence of these accidents were assembled and submitted to two experienced safety engineers who were requested to prepare recommendations as to how each accident might have been prevented.

Brief descriptions of the selected accidents, accompanied by the suggestions for prevention of such events, are included in the complete report.•

WORK ACCIDENTS TO WAREHOUSEMEN OF 274 WAREHOUSES, CLASSIFIED BY AGENCY OF INJURY AND TYPE OF WAREHOUSE.

Agency of injury	Total – all warehouses 1/		Household-goods warehouses		Merchandise warehouses		Refrigerated warehouses	
	Number	Per-cent 2/	Number	Per-cent 2/	Number	Per-cent 2/	Number	Per-cent 2/
Total	1,604	100.0	123	100.0	740	100.0	509	100.0
AGENCY								
Containers	484	30.3	30	24.4	222	30.2	152	29.9
Boxes, cases	220	13.8	26	21.1	109	14.8	82	16.1
Other	264	16.5	4	3.3	113	15.4	70	13.8
Vehicles	220	13.8	15	12.2	128	17.4	57	11.2
Powered	55	3.4	6	4.9	34	4.6	11	2.2
Hand	143	9.0	9	7.3	81	11.0	40	7.8
Railroad cars	22	1.4	–	–	13	1.8	6	1.2
Working surfaces	180	11.3	13	10.6	81	11.0	51	10.0
Floors	109	6.9	11	9.0	47	6.4	36	7.0
Other	71	4.4	2	1.6	34	4.6	15	3.0
Hand parts	108	6.8	3	2.4	85	11.5	11	2.2
Bodily motions	82	5.1	8	6.5	35	4.8	32	6.3
Handtools	55	3.4	6	4.9	11	1.5	22	4.3
Ice	42	2.6	–	–	–	–	42	8.3
Lumber	42	2.6	3	2.4	20	2.7	6	1.2
Machines	42	2.6	4	3.3	9	1.2	9	1.8
Furniture	41	2.6	23	18.7	14	1.9	3	.6
Pallets, skids	33	2.1	1	.8	22	3.0	10	2.0
Foodstuffs	26	1.6	–	–	–	–	26	5.1
Other	242	15.2	17	13.8	109	14.8	87	17.1
Unclassified	7	–	–	–	4	–	1	–

1/ Includes figures not shown separately because of insufficient information to classify.
2/ Percents are computed on classified cases only.

(Resume Reading on Page 30)

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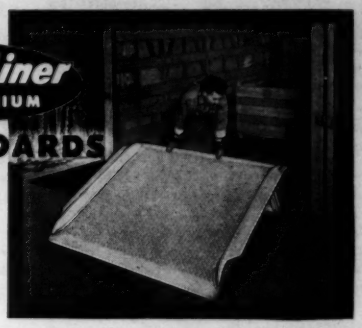

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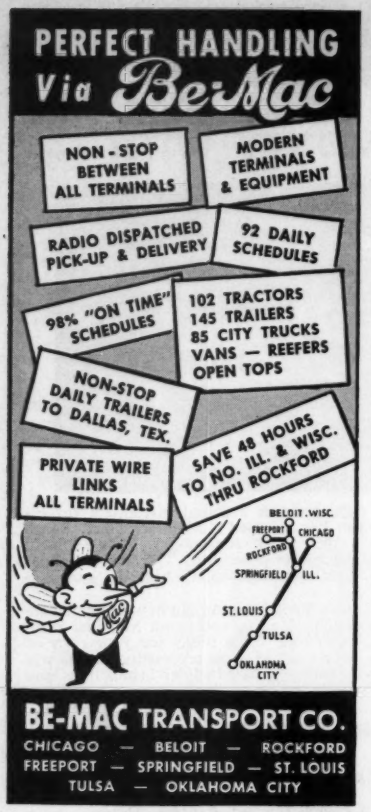

Free Literature . . .

(Continued from Page 36)

Port Directories

The Port of New York Authority has released three new directories of steamship lines, piers and services in the New Jersey-New York Port. The Steamship Pier Directory gives the number, location and occupant of all the piers and berths in the Port of New York. The directory of Steamship Lines lists the names and locations of 197 lines serving the port, together with their agents or owners. The directory of Steamship Services includes the 79 foreign, 9 intercoastal and 3 coastwise services available via the Port of New York.

Circle 75 on Service Card, Page 33

Shippers Data

Information for shippers is presented in a 20-page booklet on air freight, recently issued by **United Air Lines.** A detailed explanation of how to ship by air freight also is included, along with brief descriptions of air express, air mail and air parcel post. Among the illustrations is a 15-ton capacity DC-6A Cargoliner.

Circle 76 on Service Card, Page 33

Railroad Story

The **Association of American Railroads** has published an illustrated booklet, designed to acquaint the public with a better understanding of some of the aspects of operational railroading. Descriptive literature takes the reader on an imaginative tour of the locomotive, control tower, material yard, etc.

Circle 77 on Service Card, Page 33

Partners in Progress

A new brochure, outlining the facilities, experience, sales service, and handling and storage methods prevalent throughout the operational network of the **Associated Warehouses, Inc.,** now is available.

Circle 78 on Service Card, Page 33

New Route Map

The second edition of a map of the United States, showing routes and connecting routes, recently has been published by **Pacific Intermountain Express.** Facts, figures, terminal locations, and information of interest to shippers also is included.

Circle 79 on Service Card, Page 33

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PERMA Mix Floor Patch
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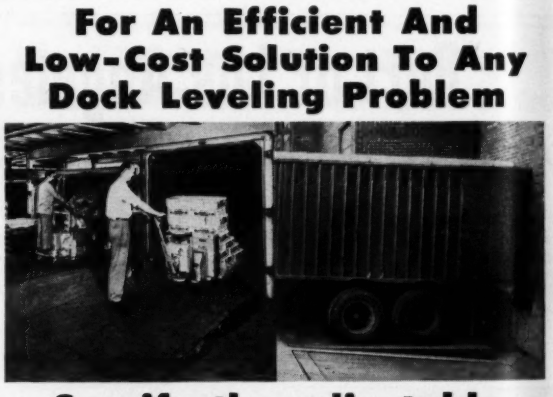
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AWA Names Culver . . .

(Continued from Page 31)

Merchandise members heard a talk on "Marketing Your Services," by William C. Gordon, Jr., American Marketing Assn., on Saturday morning, followed by a panel presentation of "Can a Safety Program Save You Money," moderated by Frank Burns, Jr., of Des Moines, Ia. The remainder of the morning was given to committee presentations, resolutions, and elections.

V. O. Appel, of Chicago, spoke on "Government in Refrigerated Warehousing" at the NARW Saturday morning session. An Armour & Co. film, "Fresh Frosted Meats for the Food Service Industry" also was shown, followed by committee reports and installations.

Social events included a family party reception Wednesday evening, the president's reception Friday evening, followed by the 64th Annual Dinner. A South Sea Luau also was presented on Wednesday evening. The convention came to a close Saturday afternoon with a general session. It included a report of the Resolutions Committee and the nomination, election, and installation of officers.

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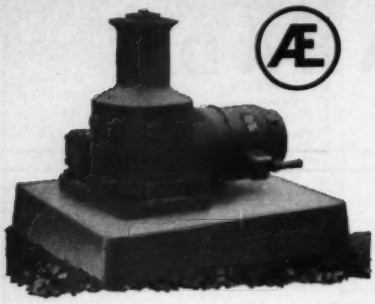

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